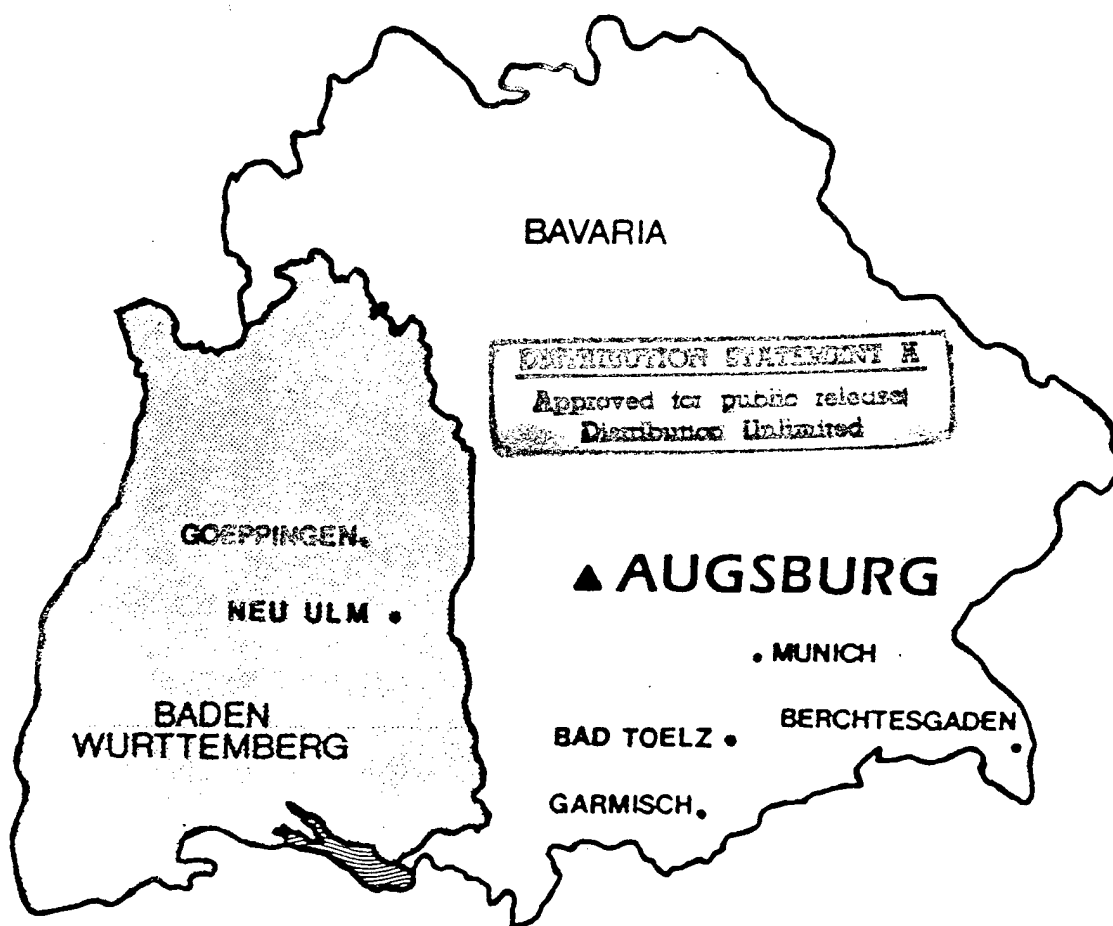
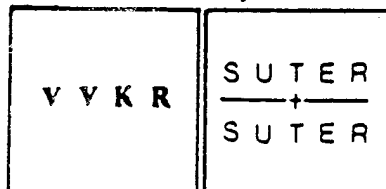


# EEAP

## PHASE III EXECUTIVE SUMMARY



Augsburg Military Community  
30 May 1986



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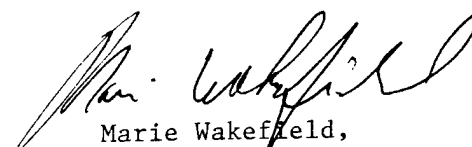


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## EXECUTIVE SUMMARY

### I. PROJECT INTRODUCTION:

This document is the end result of the Energy Engineering Analysis Program (EEAP) at Augsburg Military Community in West Germany. This EEAP was authorized by the U.S. Department of the Army, European Division, Corps of Engineers, headquartered in Frankfurt, West Germany, under contract No. DACA-90-83-6-0023. The ultimate goal of this effort is the reduction of energy consumption in compliance with the objectives set forth in the U.S. Army Facilities Energy Plan.

The scope of services for this study defines the project in three phases of work. Phase I involves data collection for all buildings at Augsburg. The data collection phase includes utility data, determination and inspection of model buildings, assignment and review of similar buildings, and review of operating procedures. Phase II utilizes and relies heavily upon the information collected in Phase I. In this phase, energy conservation recommendations are developed to estimate related energy savings, as well as implementation costs for specific recommendations. Phase III of this project screened all energy conservation projects and provided programming documents for those projects which the community is requesting funding. By definition, any programmed project has a savings to investment ratio greater than one in compliance with the revised Energy Conservation Investment Program (ECIP) criteria dated June 1985. The end result of the three phases of work are seven packages requesting funding for several projects designed to reduce energy consumption at Augsburg Military Community.

## II. PHASE I:

Phase I of the EEAP consisted of "data gathering and inspection of the facilities in the field." During this phase, several GY areas were reviewed at this military community. Complete details of the data collection including energy use data, and all building survey data can be found in the Phase I Data Report.

### A. Buildings Surveyed:

At the Augsburg Military Community, the following GY areas were included under the contractual requirement for the EEAP:

GY 007 Gablingen Kaserne: which consists primarily of a heliport with support facilities, restricted buildings, warehouses, fire station, military police station, and condemned buildings.

GY 159 Centerville Family Housing: which consists of apartment buildings, a chapel, school buildings and a gasoline station.

GY 187 Fryar Circle Family Housing: which consists of single family, duplex and multi-story housing units.

GY 280 Flak Kaserne: which consists primarily of troop housing and support facilities, hospital, motor pool and maintenance facilities.

GY 536 Reese Barracks: which consists primarily of troop housing and support facilities, community and recreational facilities, administration and brigade headquarters offices, transportation, motor pool, and equipment maintenance facilities.

GY 572 Sheridan Kaserne: which consists primarily of troop housing and support facilities, community and recreational facilities, repair shops, warehouses, and dental facility.

GY 862 Cramerton Family Housing: which consists of apartment buildings, a heating converter building, chlorination building, and grade school building.

GY 863 Augsburg Quarter Master Supply Center: which consists primarily of the main post exchange, commissary, veterinary facility, food storage, general purpose warehouses, and guard station.

GY 864 Sullivan Heights Family Housing: which consists of apartment buildings.

The other GY areas included in the Augsburg Master Planning area that were not a part of this Scope of Work are:

GY 018 Lechfeld Training Area

GY 056 Augsburg Ammo Vehicle Park

GY 522 Bonstetten Radio Relay Facility  
GY 611 Biburg Training Area  
GY 612 Holzhausen Training Area  
GY 613 Derchinger Forest Training Area  
GY 628 Deuringen Training Area  
GY 636 Haunstetten Training Area

These areas were excluded from the Scope of Services by the EUD Project Manager due to the nature and type of buildings located in these GY areas.

There were 19 buildings surveyed at Augsburg Military Community that were designated "Annex A Buildings." These facilities were audited in great detail in order to complete a computerized analysis of current energy use, possible energy conservation opportunities and the performance of the existing heating and ventilating equipment. These Annex A Buildings surveyed at Augsburg were as follows:

GY 007 Gablingen Kaserne:  
Bldg. No. 442 Aircraft Field Maintenance Hanger

GY 159 Centerville Housing:  
Bldg. No. 591 High School

GY 187 Fryar Circle Housing:  
Bldg. No. 704 Family House  
743 Duplex Family Housing

GY 280 Flak Kaserne:  
Bldg. No. 210 ECM Club/Mess Hall  
212 Billets  
220 Maintenance Bays/Storage

GY 536 Reese Barracks:  
Bldg. No. 9 Mess Hall  
33 Morale Support Center  
51 Billets

GY 572 Sheridan Kaserne:  
Bldg. No. 101 Command Building  
123 Billets  
125 Maintenance/Bowling Facility  
134 Child Care Center  
156 Billets  
178 Workshop/Upholstering and Rug Cleaning

GY 862 Cramerton Family Housing:  
Bldg. No. 568 Apartment Building  
578 Apartment Building

GY 863 Quarter Master Supply Center:  
Bldg. No. 63 Post Exchange

All other heated buildings at Augsburg were surveyed in Phase I as "walk- through similar buildings." That is, they were surveyed to discern the differences between them and an Annex A Building that they were judged similar to. Due to the wide variety of building types at Augsburg, not all facilities could be made similar to one of the 19 Annex A Buildings at Augsburg. Since this EEAP contract encompasses six military communities, there was a total of 51 Annex A Buildings, 32 of which were located at other communities. These facilities were judged by the EUD Project Manager to be representative of all facilities on all military communities under contract. As a result, some buildings at Augsburg were judged similar to Annex A Buildings at another military community in order to provide computer simulation.

The list of these buildings at other military communities follows:

<u>Community</u>	<u>GY</u>	<u>BLDG</u>	<u>USE</u>
Goeppingen	139	148	Maintenance Shop
Goeppingen	231	714	Family Housing
Garmisch	571	119	Gym
Garmisch	571	114	Office/Shops

During the computer analysis of the energy consumption of each boiler plant, each Annex A Building was reviewed as if it existed at Augsburg, whether it did or not. That is, an Annex A Building from the Garmisch Military Community was analyzed with Augsburg weather data in order to make the similar building's analysis more accurate. Complete information on all of these buildings can be found in the Phase I Data Report.

At each building, whether reviewed as an Annex A Building or a walk-through similar building, an ECO checklist for the specific building under consideration was completed. This checklist noted over 110 Energy Conservation Opportunities (ECO) that were reviewed at the facility. Each ECO was noted as "Completed" or "Not Completed" and if not completed, as "Feasible" or "Not Feasible." Based on this checklist, all energy conservation calculations were performed after incorporating the Phase I comments from both EUD and the military community. All ECO's noted as "Not Completed," and "Feasible" were reviewed for implementation. This checklist was also verified against the current ECIP Project List and the Master Planning Documents at Augsburg so that there would be no duplication of effort for projects already recommended and slated for implementation.

## B. Energy Consumption History:

As reviewed in the Phase I Data Report, the Augsburg Military Community has steadily reduced its energy consumption since the peak year of FY 1979. By FY 1983, the total reduction since 1975 has been 5%, thus approaching the mandate established by the Department of the Army to reduce overall energy consumption by 20% from the FY 1975 levels. The energy consumption trends can be seen in the following chart from data provided by the VII Corps Headquarters in Stuttgart, West Germany:

Energy Consumption History (MIL BTU)

FY	Electricity	Heating Fuel	Total Fuels
1975	482,804	1,212,948	1,695,752
1976	488,696	1,133,809	1,622,505
1977	518,091	1,153,830	1,671,921
1978	506,549	1,141,001	1,647,550
1979	512,302	1,229,549	1,741,851
1980	541,430	1,148,036	1,689,466
1981	578,098	1,099,015	1,677,113
1982	575,615	1,121,712	1,697,327
1983	587,076	1,018,326	1,605,402

For complete data and information on the Energy Consumption History, refer to the Phase I Data Report.

## C. Energy Conservation Efforts Since FY 1975:

The reduction in the energy consumption at Augsburg has been due to a number of factors. Perhaps the most significant has been the establishment of a Community - wide Energy Conservation Program by the Director of Engineering and Housing. This program has included an educational effort to inform every individual and each family on the Augsburg Community of the importance of energy conservation. This program ultimately affects every aspect of life at Augsburg. In addition, there has been an Energy Conservation Awards Program to recognize those individuals and groups leading the energy conservation efforts.

Since FY 1975, substantial energy conservation actions have been put into effect. These include the following measures.

1. Installation of outside air temperature reset control and time controls for space heating at Reese and Sheridan Kasernes.
2. Installation of thermostatic control valves to replace manual radiator valves in all buildings in Fryar Circle, Centerville, Cramerton and Sullivan Heights family housing.

3. Limiting indoor air temperature to minimum permissible levels.
4. Reduction of domestic hot water temperatures.
5. Installation of photocells for security lighting.
6. Elimination of outdoor lights and reduction of security lighting to minimum levels.
7. Installation of rotary time switches for lights and fans in toilets.
8. Installation of time switches for corridor lighting.
9. Repair and replacement of single pane windows with thermopane windows in all family housing areas.
10. Replace lamps with energy savings lamps.
11. Insulate attics.
12. Replace heating equipment, Bldgs. 60-62, 65, 67, 91.
13. Replace all broken windows, all Kasernes.
14. Hot water usage controls.
15. Consolidation of boiler plants #92 and 38.
16. Installation of night setback temperature control for all Kasernes.
17. Repair and replace piping insulation on all distribution lines.
18. Installation of storm windows, Reese and Sheridan Kaserne.
19. Repair and overhaul all boilers during off season.
20. Insulate roofs and walls.
21. Install insulated doors and windows.
22. Replace old and inefficient heating systems, and boiler plants.

See the Phase I Data Report for a listing of all current ECIP projects ongoing, under construction and funded.

### III. PHASE II

Phase II of EEAP consisted of "analysis of data (collected in Phase I), performance of feasibility and economic studies and the identification of proposed projects." More specifically, Phase II consisted of 1) verification of computer simulated buildings' energy consumption versus actual utility bills; 2) identification of proposed projects and calculation of savings, costs, and SIRs; and 3) deletion of projects, as requested by Augsburg Military Community and required under ECIP criteria.

#### A. Methodology:

The basis of the analysis phase of this EEAP at Augsburg is the computerized analysis of the Annex A Building at this military community and at several other communities which were judged similar to other buildings at Augsburg. As noted earlier, the calculated energy consumption of each building at Augsburg was based on the computer analysis of these facilities.

The computer program utilized for this analysis is entitled C-PARTS (Component Performance Analysis for Real Thermal Systems). This program was developed and copyrighted by VVKR Incorporated of Alexandria, Virginia and is designed to allow an accurate assessment of each energy sensitive element in an existing building. The program utilizes standard ASHRAE heat transfer methodologies and thermal resistance values for building materials from the National Bureau of Standards or ASHRAE. Since the program was specifically designed with the analysis of existing buildings in mind, it is based on an hour by hour analysis of a typical day each month, and provides outputs that can easily be compared with the actual utility consumption data of an existing facility.

In this manner, the C-PARTS analysis can be checked against a known factor, the utility consumption of the facility for accuracy. Any significant deviations between the C-PARTS output and the actual consumption point to a problem in the C-PARTS data input or analysis. As a result, the final C-PARTS outputs have been verified against real data rather than a simple estimate of energy consumption.

As reviewed earlier, the vast majority of buildings analyzed are walk-through similar buildings. Each of these facilities was made similar to an Annex A building, located either at this community or on another. For each walk-through building, a variation checklist was provided to note the differences between that building and the Annex A building judged similar to it. For example, two buildings may be similar in respect to the basic construction and use, but one has 25%

greater window area and 30% greater floor area than the other. These variations have been noted for each walk-through building in respect to its associated Annex A building. All heat transfer coefficients, U-values, are assumed equal to those for the Annex A Building, unless noted otherwise.

In the computer analysis process, all Annex A buildings associated with this military community are first analyzed with the local weather data. This is the process for all Annex A buildings, whether located at this community or simply similar to a building at this base.

After these analyses have been complete, each of the walk-through similar buildings at this community is analyzed by C-PARTS in relation to its associated Annex A building. The variations noted above are taken into account in the analysis process to derive an accurate estimation of the energy use at each individual walk-through facility.

#### B. Boiler Plant Verification Analyses:

The next step in the C-PARTS Analysis at this military community is the verification of the computed energy consumption against the actual energy consumption for the test year. There is no specific energy consumption data for each specific building. Rather, there is energy consumption data for central boiler plants, which provide heat to a number of buildings, and for electrical substations, which provide power to a number of buildings.

After the energy consumption data has been calculated for all of the Annex A buildings and the walk-through similar buildings, the facilities are all grouped according to the central plants and substations servicing them. The totals of these facility groupings are then verified against the historical energy consumption data.

There are several factors that can cause major deviations between the ASHRAE computed loads of C-PARTS and actual consumption data. These are as follows:

1. Distribution line losses and steam leaks,
2. Lack of heating system controls that cause building occupants to open excessive windows for comfort and thus increase infiltration losses,
3. Large doors that are left open for excessive time periods in repair and maintenance facilities,
4. Low boiler efficiencies due to poor or non-existent maintenance and controls.

Whenever possible, corrections for these factors were introduced, based on additional data that was collected during the Phase I survey. This data includes the ambient air conditions on the day of the survey, the number of windows and doors found open, comments on leaking pipes, doors found open, poor heating system controls, the measurement of the boiler flue gas readings, building plans and blueprints and photographs of building conditions. With this additional information, and the ability of the C-PARTS program to rapidly re-evaluate the building loads, adjustments were made to account for the infiltration and other losses to verify the computer analysis with the actual energy consumption within reasonable limits.

### C. Energy Conservation Opportunities:

The Energy Conservation Opportunities (ECOs) studies at this community was based on the Annex B requirements of the Scope of Services dated 20 January 1983. The ECO's noted in the Annex B were those required by the Army for analysis. In addition to these, however, several additional ECO's were voluntarily added to the analysis procedure to provide a complete review of all feasible energy savings measures at this community. These additional ECO's also include some requested by various reviewing agencies after Phase I Data Report was submitted. Others requested were judged outside the requirements of this contract.

The ECO's proposed for review and analysis are divided into eight major groupings according to their building system. These groups are as follows:

- 1) Building Envelope
- 2) Cooling
- 3) Heating
- 4) Lighting
- 5) Special Equipment
- 6) Temperature Controls
- 7) Ventilation
- 8) Domestic Hot Water

Within these groupings, all ECO's under each Increment of study have been reviewed and analyzed. The analysis of each ECO was performed either by the C-PARTS program or by manual calculations, based on data derived from the C-PARTS analysis and Boiler Plant Verification Analysis.

Generally speaking, the Building Envelope ECO's and Temperature Control ECO's were analyzed by re-running the C-PARTS load analysis for a specific building with revised inputs reflecting the ECO. For example, by analyzing the building first as existing, and then with additional roof insulation and comparing the two outputs, the energy savings associated with the roof insulation can easily be determined. These computer analyses were conducted on a full year's basis to obtain total savings in a year.

The manual calculations were based on data from the C-PARTS analysis of the facility or from the Boiler Plant Verification Analysis. All methods of the calculations were derived from ASHRAE or from several guidebooks provided by the U.S. Department of Energy. These are referenced with the discussion of the calculation methodology for each ECO.

The Master List of all Energy Conservation Opportunities that was reviewed at this community is as follows:

#### BUILDING ENVELOPE

- B-1 Insulation added to walls.
- B-2.1 Insulation added to existing roof.
- B-2.2 Insulation added with new roof.
- B-3 Insulation added to basement ceiling.
- B-4.1 Insulation added to attic floors.
- B-4.2 Insulation added to usable attic.
- B-5 Windows caulked.
- B-5.5 Caulk and weatherstrip windows.
- B-6 Windows weatherstripped.
- B-7 Doors weatherstripped.
- B-7.5 Caulk and weatherstrip doors.
- B-8 Storm windows installed.
- B-9 Storm doors installed.
- B-10 Double pane windows installed.
- B-11 Sun control screens or louvers added to windows.
- B-12 Solar control film added to windows.
- B-13.1 Glass area replaced with Spandrel panel
- B-13.2 Glass area replaced with glass blocks
- B-14 Automatic door closers installed.
- B-15 Doors vestibuled.
- B-16 Thermal barriers installed.
- B-17.1 Double glaze skylights.

- B-17.2 Remove existing skylights.
- B-18 Loading dock doors sealed.
- B-19 Air curtains installed.
- B-20 Thermal/solar control shades installed.

#### COOLING SYSTEMS

- C-1 Economizer systems provide free cooling during winter season.
- C-2 Dual duct or multizone systems converted to single zone systems.
- C-3 Cooling pipe lines and ductwork insulated.
- C-4 Absorption cooling equipment replaced.
- C-5 Cooling equipment is serviced, cleaned and adjusted regularly.
- C-6 Cooling of unoccupied areas is prevented.
- C-7 Variable air volume systems installed.
- C-8 Filters cleaned and inspected regularly.
- C-9 Temperature of chilled water raised.
- C-10 Solar assisted cooling equipment installed.
- C-11 Reheat coils removed.
- C-12 Heat recovered from refrigerant gas.

#### HEATING SYSTEMS

- H-1 Combustion air to boiler preheated.
- H-2 Fuel oil to boiler preheated.
- H-3 Steam condensate returned to boilers.
- H-4 Flue gas dampers installed.
- H-5 Automatic ignition pilot lights installed.
- H-6 Flue gas analysis and adjustment performed regularly.
- H-7 Combustion is monitored and adjusted regularly.
- H-8 Heating equipment converted from natural gas to oil or coal.
- H-9 Steam, condensate and hot water piping insulated.
- H-9.5 Insulate valves and fittings.
- H-10 Unnecessary humidification removed.
- H-11 Oxygen trim controls installed on boilers.

- H-12 Heat recovery systems installed.
- H-13 Solar energy heating system installed.
- H-14 Reheat coils removed.
- H-15 Temperature of hot water used for heating lowered.
- H-16 Connected to district heating.
- H-17 Turbulators installed in fire tube boilers.
- H-18 Supply and return piping installed.
- H-19 Spot heating installed.
- H-20 Fluidized Bed Combustion System

#### LIGHTING SYSTEMS

- L-1 Lighting fixtures removed.
- L-2 Lamps and/or ballasts removed from fixtures.
- L-3 Task lighting installed.
- L-4 Lower wattage lamps installed.
- L-5 Lamps and fixtures cleaned regularly.
- L-6 Exterior lighting is reduced to minimum.
- L-7 Lighting is off in unoccupied areas.
- L-8 Photocell controls installed.
- L-9 Automatic time clock controls installed.
- L-10 Fixtures relamped on schedule.
- L-11 Natural daylighting is utilized.
- L-12 Incandescent fixtures replaced with fluorescent fixtures.
- L-13 Exterior lighting replaced with low or high pressure sodium fixtures.
- L-14 Mercury vapor fixtures replaced with high pressure sodium.
- L-15 High efficiency ballasts installed.
- L-16 Power reducers installed.

### SPECIAL EQUIPMENT SYSTEMS

- S-1 Time delay switches installed on elevator motors.
- S-2 Motors and motor driven equipment are maintained and adjusted regularly.
- S-3 Time clocks installed to turn off vending machines and drinking fountains overnight and during weekends.
- S-4 Kitchen equipment and laundry equipment maintained and cleaned regularly.
- S-5 Co-generation equipment installed.
- S-6 Laundry waste air/water heat recovery.
- S-7 Kitchen waste air/water heat recovery.
- S-8 Individual metering of family housing installed.
- S-9 Peak demand load controlled.
- S-10 Electrical Load Replacement

### TEMPERATURE CONTROL

- T-1 Heating and cooling reduced to unoccupied areas.
- T-2 Time clocks added to heating and cooling systems.
- T-3 Tamperproof thermostats installed.
- T-4 Thermostats set at 78° for cooling, 65° for heating.
- T-5 Thermostats relocated from outside walls and from areas subject to drafts or direct sunlight.
- T-6 Economizer controls added to heating and cooling system.
- T-7 Temperature control system adjusted and recalibrated seasonally.
- T-8 Automatic energy management systems installed.
- T-9 Zone control implemented.
- T-10 Thermostatic radiator control valves installed.
- T-11 Night setback controls installed.
- T-12 Outside air reset installed.
- T-13 Duty cycling controls installed.
- T-14 Heating monitoring devices installed.

### VENTILATION SYSTEMS

- V-1 Outside air reduced to minimum levels.
- V-2 Exhaust systems balanced with the outside air intake systems.
- V-3 Time clocks installed to shut down exhaust systems overnight and during weekends.
- V-4 Outside air dampers sealed and adjusted to operate properly.
- V-5 Exhaust hoods are equipped with make-up air systems.
- V-6 Toilet exhaust fans wired to operate only when lights are turned on.
- V-7 Heat recovery systems installed between exhaust air and outside air.
- V-8 Maintenance Shop Exhaust system installed.

### DOMESTIC HOT WATER SYSTEMS

- W-1 Temperature of domestic hot water reduced.
- W-2 Hot water piping insulated.
- W-3 Storage tanks insulated.
- W-4.1 Eliminate hot water use.
- W-4.2 Time clocks installed to shut off water heaters overnight and during weekends.
- W-5 Flow restrictors installed in faucets and shower heads.
- W-6 Time clocks installed to shut off circulating water pumps overnight and during weekends.
- W-7 System equipment is serviced, cleaned and adjusted regularly.
- W-8 Solar hot water system installed.
- W-9 Systems decentralized.
- W-10 Hot water production supplemented by heat pump

### D. Projects Requested for Funding:

Of the complete list of ECOs reviewed, 66 were analyzed in detail, with calculations estimating energy savings and implementation costs. Of the 66 ECOs analyzed, 16 are being requested for funding. The remaining 50 ECOs are being dropped due to insufficient SIRs or at the

request of Augsburg Milcom. A letter dated 31 January 1986 from Augsburg Milcom to VVKR outlined those projects for which funding was being requested. Of those projects, deletions were made based on ECIP criteria. ECIP criteria states that the ESIR and SIR must be greater than one for a project to be eligible for funding. See the following section for complete lists of projects and associated buildings where funding is being requested. The following section also shows the results of a life cycle cost analysis performed for each task at each building, which is the basis for funding requests.

#### IV. Phase III

Phase III of this study consists of preparing required programming documents, making any required detail changes to the Energy Report, and preparing the Executive Summary. The projects being requested for funding were formed into seven separate packages. A DD 1391 form complete with all backup material was developed for each package. The seven packages are outlined in table form as follows:

##### PROJECT LISTING FOR PACKAGE # 1: ROOF INSULATION

ECO #	BUILDING #	DISCOUNTED SAVINGS	INVESTMENT COST	SIR	ESIR
B- 2.1	1- 7- 422	234582.	210050.	1.120	1.120
B- 2.1	1- 7- 442	320674.	215385.	1.490	1.490
B- 2.1	1- 7- 446	347326.	233271.	1.490	1.490
B- 2.1	1-572- 114	1826.	1712.	1.070	1.070
B- 2.1	1-572- 157	33422.	26573.	1.260	1.260
B- 2.1	1-572- 158	14611.	11649.	1.250	1.250
B- 2.1	1-572- 175	6392.	5894.	1.080	1.080
B- 2.1	1-862- 555	136716.	101238.	1.350	1.350
TOTAL		1095549.	805772.	1.360	1.360

DEFINITION OF ECO # CODES:

B- 2.1 ROOF INSULATION

##### PROJECT LISTING PACKAGE # 2: BLDG. MODS. (HIGH BAY AREAS)

ECO #	BUILDING #	DISCOUNTED SAVINGS	INVESTMENT COST	SIR	ESIR
B-18.0	1- 7- 422	54974.	5943.	9.250	9.250
B-18.0	1- 7- 440	148490.	8171.	18.170	18.170
B-18.0	1- 7- 446	82511.	6686.	12.340	12.340
B-18.0	1-159- 590	97981.	10400.	9.420	9.420
B-18.0	1-280- 220	1283493.	89141.	14.400	14.400
B-18.0	1-280- 221	237455.	14857.	15.980	15.980
B-18.0	1-536- 13	201791.	12628.	15.980	15.980
B-18.0	1-536- 17	119377.	15600.	7.650	7.650
B-18.0	1-536- 18	85237.	11143.	7.650	7.650
B-18.0	1-536- 20	522310.	32685.	15.980	15.980
B-18.0	1-536- 21	585749.	40113.	14.600	14.600
B-18.0	1-536- 22	296786.	18571.	15.980	15.980
B-18.0	1-536- 23	542317.	37142.	14.600	14.600

ECO #	BUILDING #		DISCOUNTED SAVINGS	INVESTMENT COST	SIR	ESIR
B-18.0	1-536-	25	318338.	41599.	7.650	7.650
B-18.0	1-536-	28	113668.	14857.	7.650	7.650
B-18.0	1-536-	37	267128.	34914.	7.650	7.650
B-18.0	1-536-	38	136447.	17828.	7.650	7.650
B-18.0	1-536-	39	289906.	37885.	7.650	7.650
B-18.0	1-536-	40	5709.	743.	7.690	7.690
B-18.0	1-536-	41	113668.	14857.	7.650	7.650
B-18.0	1-536-	43	73876.	9657.	7.650	7.650
B-18.0	1-536-	48	45501.	5943.	7.660	7.660
B-18.0	1-536-	88	35212.	3714.	9.480	9.480
B-18.0	1-572-	102	62393.	8171.	7.640	7.640
B-18.0	1-572-	107	90716.	11885.	7.630	7.630
B-18.0	1-572-	111	396877.	51999.	7.630	7.630
B-18.0	1-572-	116	842829.	52742.	15.980	15.980
B-18.0	1-572-	119	59331.	3714.	15.970	15.970
B-18.0	1-572-	121	700434.	43828.	15.980	15.980
B-18.0	1-572-	125	396877.	51999.	7.630	7.630
B-18.0	1-572-	127	22714.	2971.	7.640	7.640
B-18.0	1-572-	140	178059.	11143.	15.980	15.980
B-18.0	1-572-	141	189925.	11885.	15.980	15.980
B-18.0	1-572-	142	130594.	8171.	15.980	15.980
B-18.0	1-572-	143	118728.	7428.	15.980	15.980
B-18.0	1-572-	144	100172.	12628.	7.930	7.930
B-18.0	1-572-	147	273054.	17085.	15.980	15.980
B-18.0	1-572-	159	142460.	8914.	15.980	15.980
B-18.0	1-572-	167	106861.	6686.	15.980	15.980
B-18.0	1-572-	170	56784.	5943.	9.560	9.560
B-18.0	1-572-	171	70980.	7428.	9.560	9.560
B-18.0	1-572-	173	27975.	2971.	9.410	9.410
B-18.0	1-572-	176	94995.	5943.	15.990	15.990
B-18.0	1-572-	177	403648.	25257.	15.980	15.980
B-18.0	1-572-	178	249321.	15600.	15.980	15.980
B-18.0	1-863-	63	14266.	1486.	9.600	9.600
B-19.1	1-280-	220	122000.	4636.	26.310	26.310
B-19.1	1-536-	13	21632.	843.	25.660	25.660
B-19.1	1-536-	16	44428.	1686.	26.350	26.350
B-19.1	1-536-	22	83331.	2950.	28.240	28.240
B-19.1	1-536-	23	33470.	1264.	26.470	26.470
B-19.1	1-536-	25	36355.	2529.	14.380	14.380
B-19.1	1-536-	37	27131.	2107.	12.870	12.870
B-19.1	1-536-	41	20224.	1686.	12.000	12.000
B-19.1	1-536-	48	10253.	843.	12.160	12.160
B-19.1	1-536-	88	9071.	421.	21.520	21.520
B-19.1	1-572-	107	30144.	2107.	14.300	14.300
B-19.1	1-572-	119	16055.	843.	19.050	19.050
B-19.1	1-572-	159	18584.	843.	22.050	22.050
B-19.1	1-572-	167	51692.	1686.	30.660	30.660
TOTAL			10912287.	885398.	12.320	12.320

DEFINITION OF ECO # CODES:  
 B-18.0 SEAL LOADING DOCK DOORS  
 B-19.1 AIR DESTRATIFICATION

PROJECT LISTING PACKAGE # 3: HEATING SYSTEM IMPROVEMENTS

ECO #	BUILDING #	DISCOUNTED SAVINGS	INVESTMENT COST	SIR	ESIR
H- 1.0	1-536- 38	119076.	59413.	2.000	2.000
H- 1.0	1-536- 53	4321.	2492.	1.730	1.730
H- 1.0	1-536-2027	3056.	2492.	1.230	1.230
H- 9.0	1- 7- 421	18262.	9789.	1.870	1.870
H- 9.0	1- 7- 441	108211.	37300.	2.900	2.900
H- 9.0	1- 7- 445	23409.	9831.	2.380	2.380
H- 9.0	1-280- 207	83555.	19641.	4.250	4.250
H- 9.0	1-280- 212	36070.	10031.	3.600	3.600
H- 9.0	1-280- 215	99706.	23307.	4.280	4.280
H- 9.0	1-280- 222	17259.	4573.	3.770	3.770
H- 9.0	1-536- 3	126839.	49533.	2.560	2.560
H- 9.0	1-536- 20	3561.	759.	4.690	4.690
H- 9.0	1-536- 21	21362.	5521.	3.870	3.870
H- 9.0	1-536- 38	186727.	157577.	1.180	1.180
H- 9.0	1-536- 73	69218.	15868.	4.360	4.360
H- 9.0	1-572- 109	229856.	191411.	1.200	1.200
H- 9.0	1-572- 132	7060.	2592.	2.720	2.720
H- 9.0	1-572- 146	7214.	1897.	3.800	3.800
H- 9.0	1-572- 150	34341.	18313.	1.880	1.880
H- 9.0	1-572- 152	18993.	17849.	1.060	1.060
H- 9.0	1-572- 160	94696.	89141.	1.060	1.060
H- 9.0	1-572- 167	83281.	20483.	4.070	4.070
H- 9.0	1-572- 181	4426.	1538.	2.880	2.880
H- 9.0	1-863- 92	557865.	434209.	1.280	1.280
H- 9.5	1- 7- 421	76149.	1682.	45.280	45.280
H- 9.5	1- 7- 441	57073.	1460.	39.080	39.080
H- 9.5	1- 7- 445	103366.	1637.	63.130	63.130
H- 9.5	1-280- 207	214960.	2700.	79.630	79.630
H- 9.5	1-280- 212	187839.	2478.	75.800	75.800
H- 9.5	1-280- 215	221293.	3142.	70.430	70.430
H- 9.5	1-280- 222	41093.	1372.	29.950	29.950
H- 9.5	1-536- 3	333033.	3275.	101.700	101.700
H- 9.5	1-536- 20	45932.	1372.	33.480	33.480
H- 9.5	1-536- 21	72198.	1637.	44.090	44.090
H- 9.5	1-536- 38	240727.	4779.	50.370	50.370
H- 9.5	1-536- 73	207381.	1637.	126.650	126.650
H- 9.5	1-572- 109	237536.	5311.	44.730	44.730

ECO #	BUILDING #	DISCOUNTED SAVINGS	INVESTMENT COST	SIR	ESIR
H- 9.5	1-572- 132	26872.	1283.	20.940	20.940
H- 9.5	1-572- 146	41001.	1283.	31.950	31.950
H- 9.5	1-572- 152	70543.	2080.	33.920	33.920
H- 9.5	1-572- 160	177977.	3009.	59.140	59.140
H- 9.5	1-572- 167	68579.	1460.	46.960	46.960
H- 9.5	1-572- 181	30349.	1372.	22.120	22.120
H- 9.5	1-863- 92	996429.	16109.	61.860	61.860
W- 2.0	1- 7- 440	4475.	369.	12.130	12.130
W- 2.0	1-280- 201	3927.	369.	10.650	10.650
W- 2.0	1-280- 202	3927.	369.	10.650	10.650
W- 2.0	1-280- 203	3927.	369.	10.650	10.650
W- 2.0	1-280- 210	3561.	369.	9.660	9.660
W- 2.0	1-280- 211	3561.	369.	9.660	9.660
W- 2.0	1-280- 212	3561.	369.	9.660	9.660
W- 2.0	1-280- 213	3561.	369.	9.660	9.660
W- 2.0	1-280- 214	3540.	369.	9.600	9.600
W- 2.0	1-280- 215	3540.	369.	9.600	9.600
W- 2.0	1-280- 220	3540.	369.	9.600	9.600
W- 2.0	1-536- 8	3927.	369.	10.650	10.650
W- 2.0	1-536- 10	3927.	369.	10.650	10.650
W- 2.0	1-536- 18	2060.	369.	5.590	5.590
W- 2.0	1-536- 20	3927.	369.	10.650	10.650
W- 2.0	1-536- 25	2060.	369.	5.590	5.590
W- 2.0	1-536- 28	2060.	369.	5.590	5.590
W- 2.0	1-536- 30	2060.	369.	5.590	5.590
W- 2.0	1-536- 31	2060.	369.	5.590	5.590
W- 2.0	1-536- 32	2060.	369.	5.590	5.590
W- 2.0	1-536- 34	2060.	369.	5.590	5.590
W- 2.0	1-536- 35	2060.	369.	5.590	5.590
W- 2.0	1-536- 37	2060.	369.	5.590	5.590
W- 2.0	1-536- 38	2060.	369.	5.590	5.590
W- 2.0	1-536- 39	2060.	369.	5.590	5.590
W- 2.0	1-536- 40	2060.	369.	5.590	5.590
W- 2.0	1-536- 43	2060.	369.	5.590	5.590
W- 2.0	1-536- 45	2060.	369.	5.590	5.590
W- 2.0	1-536- 46	2060.	369.	5.590	5.590
W- 2.0	1-536- 47	2060.	369.	5.590	5.590
W- 2.0	1-536- 49	2060.	369.	5.590	5.590
W- 2.0	1-536- 55	2060.	369.	5.590	5.590
W- 2.0	1-536- 88	2529.	369.	6.860	6.860
W- 2.0	1-572- 101	1975.	369.	5.350	5.350
W- 2.0	1-572- 104	1975.	369.	5.350	5.350
W- 2.0	1-572- 106	1975.	369.	5.350	5.350
W- 2.0	1-572- 108	1975.	369.	5.350	5.350
W- 2.0	1-572- 111	1975.	369.	5.350	5.350
W- 2.0	1-572- 114	3927.	369.	10.650	10.650
W- 2.0	1-572- 115	3927.	369.	10.650	10.650

ECO #	BUILDING #	DISCOUNTED SAVINGS	INVESTMENT COST	SIR	ESIR
W- 2.0	1-572- 116	3927.	369.	10.650	10.650
W- 2.0	1-572- 120	3927.	369.	10.650	10.650
W- 2.0	1-572- 121	3927.	369.	10.650	10.650
W- 2.0	1-572- 122	3927.	369.	10.650	10.650
W- 2.0	1-572- 123	3927.	369.	10.650	10.650
W- 2.0	1-572- 124	1975.	369.	5.350	5.350
W- 2.0	1-572- 125	1975.	369.	5.350	5.350
W- 2.0	1-572- 126	1975.	369.	5.350	5.350
W- 2.0	1-572- 128	1975.	369.	5.350	5.350
W- 2.0	1-572- 131	1975.	369.	5.350	5.350
W- 2.0	1-572- 132	2634.	369.	7.140	7.140
W- 2.0	1-572- 135	1975.	369.	5.350	5.350
W- 2.0	1-572- 140	3927.	369.	10.650	10.650
W- 2.0	1-572- 141	3927.	369.	10.650	10.650
W- 2.0	1-572- 142	3927.	369.	10.650	10.650
W- 2.0	1-572- 143	3927.	369.	10.650	10.650
W- 2.0	1-572- 144	2146.	369.	5.820	5.820
W- 2.0	1-572- 145	3561.	369.	9.660	9.660
W- 2.0	1-572- 147	3927.	369.	10.650	10.650
W- 2.0	1-572- 180	3927.	369.	10.650	10.650
W- 2.0	1-572- 181	2529.	369.	6.860	6.860
W- 2.0	1-572- 182	2529.	369.	6.860	6.860
W- 2.0	1-572- 183	2634.	369.	7.140	7.140
W- 2.0	1-572- 184	2529.	369.	6.860	6.860
W- 2.0	1-863- 57	2750.	369.	7.460	7.460
W- 2.0	1-863- 60	2750.	369.	7.460	7.460
W- 3.0	1- 7- 440	457.	56.	8.180	8.180
W- 3.0	1-159- 590	105.	77.	1.370	1.370
W- 3.0	1-280- 203	4475.	666.	6.720	6.720
W- 3.0	1-280- 210	6392.	1792.	3.570	3.570
W- 3.0	1-280- 211	7853.	1301.	6.030	6.030
W- 3.0	1-280- 212	8858.	1468.	6.030	6.030
W- 3.0	1-280- 213	8492.	1409.	6.030	6.030
W- 3.0	1-280- 214	19282.	3171.	6.080	6.080
W- 3.0	1-280- 215	11274.	1857.	6.070	6.070
W- 3.0	1-280- 224	91.	77.	1.190	1.190
W- 3.0	1-536- 10	913.	491.	1.860	1.860
W- 3.0	1-536- 30	86.	77.	1.120	1.120
W- 3.0	1-536- 31	86.	77.	1.120	1.120
W- 3.0	1-536- 46	4207.	1216.	3.460	3.460
W- 3.0	1-536- 47	2318.	1165.	1.990	1.990
W- 3.0	1-572- 115	7945.	1195.	6.650	6.650
W- 3.0	1-572- 116	822.	448.	1.840	1.840
W- 3.0	1-572- 118	5479.	1387.	3.950	3.950
W- 3.0	1-572- 120	8675.	1301.	6.670	6.670
W- 3.0	1-572- 121	731.	406.	1.800	1.800
W- 3.0	1-572- 122	9680.	1451.	6.670	6.670

ECO #	BUILDING #	DISCOUNTED SAVINGS	INVESTMENT COST	SIR	ESIR
W- 3.0	1-572- 123	8401.	1259.	6.670	6.670
W- 3.0	1-572- 124	1030.	299.	3.440	3.440
W- 3.0	1-572- 126	4484.	1301.	3.450	3.450
W- 3.0	1-572- 128	4484.	1301.	3.450	3.450
W- 3.0	1-572- 130	2938.	853.	3.440	3.440
W- 3.0	1-572- 131	4484.	1301.	3.450	3.450
W- 3.0	1-572- 132	211.	171.	1.230	1.230
W- 3.0	1-572- 165	2404.	1131.	2.130	2.130
W- 3.0	1-572- 170	105.	77.	1.370	1.370
W- 3.0	1-572- 171	105.	77.	1.370	1.370
W- 3.0	1-572- 180	4840.	1238.	3.910	3.910
W- 3.0	1-572- 181	2318.	542.	4.280	4.280
W- 3.0	1-572- 182	2213.	512.	4.320	4.320
W- 3.0	1-572- 183	2318.	533.	4.350	4.350
W- 3.0	1-572- 184	5269.	1216.	4.330	4.330
TOTAL		5751867.	1301891.	4.418	4.418

DEFINITION OF ECO CODES:

H- 1.0 PREHEAT BOILER COMBUSTION AIR  
H- 9.0 INSULATE PIPES  
H- 9.5 INSULATE VALVES & FITTINGS  
W- 2.0 INSULATE DOMESTIC HOT WATER LINES  
W- 3.0 INSULATE STORAGE TANKS

PROJECT LISTING PACKAGE # 4: HVAC & ELECTRICAL MODS.

ECO #	BUILDING #	DISCOUNTED SAVINGS	INVESTMENT COST	SIR	ESIR
H-19.0	1-280- 220	352210.	29080.	12.110	12.110
H-19.0	1-536- 13	75613.	7270.	10.400	10.400
H-19.0	1-536- 16	33607.	3635.	9.240	9.240
H-19.0	1-536- 22	65827.	4847.	13.580	13.580
H-19.0	1-536- 23	266143.	21811.	12.200	12.200
H-19.0	1-536- 25	96798.	21811.	4.440	4.440
H-19.0	1-536- 41	47096.	13329.	3.530	3.530
H-19.0	1-536- 88	23907.	4847.	4.930	4.930
H-19.0	1-572- 107	13939.	3635.	3.830	3.830
H-19.0	1-572- 111	50076.	9694.	5.170	5.170
H-19.0	1-572- 116	79210.	6059.	13.070	13.070
H-19.0	1-572- 119	12606.	1212.	10.400	10.400
H-19.0	1-572- 124	18393.	6059.	3.040	3.040

ECO #	BUILDING #	DISCOUNTED SAVINGS	INVESTMENT COST	SIR	ESIR
H-19.0	1-572- 147	123745.	10906.	11.350	11.350
H-19.0	1-572- 159	64943.	6059.	10.720	10.720
H-19.0	1-572- 167	50617.	3635.	13.920	13.920
H-19.0	1-572- 170	54314.	10906.	4.980	4.980
H-19.0	1-572- 173	23771.	4847.	4.900	4.900
H-19.0	1-572- 176	118728.	10906.	10.890	10.890
H-19.0	1-572- 177	245306.	18176.	13.500	13.500
L-12.0	1-159- 590	5255.	1314.	4.000	4.000
L-12.0	1-280- 221	17181.	5120.	3.360	3.360
L-12.0	1-280- 223	5950.	1722.	3.460	3.460
L-12.0	1-536- 18	5294.	1042.	5.080	5.080
L-12.0	1-536- 33	62232.	10738.	5.800	5.800
L-12.0	1-536- 36	4347.	1042.	4.170	4.170
L-12.0	1-572- 107	24614.	6071.	4.050	4.050
L-12.0	1-572- 109	8250.	2039.	4.050	4.050
L-12.0	1-572- 112	27748.	4531.	6.120	6.120
L-12.0	1-572- 114	6820.	1994.	3.420	3.420
L-12.0	1-572- 123	16108.	3806.	4.230	4.230
L-12.0	1-572- 127	5026.	1223.	4.110	4.110
L-12.0	1-572- 132	29720.	7748.	3.840	3.840
L-12.0	1-572- 135	31651.	5165.	6.130	6.130
L-12.0	1-572- 145	1976.	544.	3.640	3.640
L-12.0	1-572- 163	17805.	2900.	6.140	6.140
L-12.0	1-572- 168	4843.	770.	6.290	6.290
L-12.0	1-572- 173	5751.	1495.	3.850	3.850
L-12.0	1-572- 175	10158.	2401.	4.230	4.230
L-12.0	1-572- 176	11029.	3262.	3.380	3.380
L-12.0	1-572- 177	20199.	6026.	3.350	3.350
L-12.0	1-572- 178	6558.	1903.	3.450	3.450
L-12.0	1-572- 180	25075.	5981.	4.190	4.190
L-12.0	1-862- 555	11621.	3036.	3.830	3.830
L-12.0	1-863- 62	59260.	15722.	3.770	3.770
L-12.0	1-863- 65	69139.	18350.	3.770	3.770
L-12.0	1-863- 66	32509.	8609.	3.780	3.780
L-12.0	1-863- 67	69362.	18440.	3.760	3.760
L-12.0	1-863- 95	1013.	227.	4.470	4.470
S- 7.0	1-280- 203	50224.	16364.	3.070	3.070
S- 7.0	1-280- 210	559499.	32727.	17.100	17.100
S- 7.0	1-280- 215	199489.	32727.	6.100	6.100
S- 7.0	1-536- 35	25670.	16364.	1.570	1.570
S- 7.0	1-536- 53	21603.	16364.	1.320	1.320
S- 7.0	1-572- 118	335864.	32727.	10.260	10.260
S- 7.0	1-572- 158	546167.	32727.	16.690	16.690
S- 7.0	1-572- 175	63283.	16364.	3.870	3.870
S- 7.0	1-572- 180	293767.	32727.	8.980	8.980
S- 7.0	1-572- 181	25080.	16364.	1.530	1.530
S- 7.0	1-572- 182	22551.	16364.	1.380	1.380

ECO #	BUILDING #	DISCOUNTED SAVINGS	INVESTMENT COST	SIR	ESIR
S- 7.0	1-572- 183	24132.	16364.	1.470	1.470
T- 2.0	1-536- 8	8689.	1396.	6.220	6.220
T- 2.0	1-536- 10	8689.	1396.	6.220	6.220
T- 2.0	1-536- 13	19453.	1396.	13.930	13.930
T- 2.0	1-536- 17	37249.	1396.	26.680	26.680
T- 2.0	1-536- 20	19972.	1396.	14.310	14.310
T- 2.0	1-536- 33	31385.	1396.	22.480	22.480
T- 2.0	1-536- 34	3731.	1396.	2.670	2.670
T- 2.0	1-536- 35	15148.	1396.	10.85	10.850
T- 2.0	1-536- 38	98180.	1396.	70.320	70.320
T- 2.0	1-536- 39	114572.	1396.	82.060	82.060
T- 2.0	1-536- 44	2374.	1396.	1.700	1.700
T- 2.0	1-536- 47	46801.	1396.	33.520	33.520
T- 2.0	1-536- 68	4344.	1396.	3.110	3.110
T- 2.0	1-536- 69	4344.	1396.	3.110	3.110
T- 2.0	1-536- 70	4344.	1396.	3.110	3.110
T- 2.0	1-536- 71	4344.	1396.	3.110	3.110
T- 2.0	1-536- 72	4344.	1396.	3.110	3.110
T- 2.0	1-536- 73	5123.	1396.	3.670	3.670
T- 2.0	1-536- 74	4344.	1396.	3.110	3.110
T- 2.0	1-536- 75	4344.	1396.	3.110	3.110
T- 2.0	1-536- 76	4344.	1396.	3.110	3.110
T- 2.0	1-536- 78	4344.	1396.	3.110	3.110
T- 2.0	1-536- 80	4344.	1396.	3.110	3.110
T- 2.0	1-536- 83	4344.	1396.	3.110	3.110
T- 2.0	1-536- 84	4344.	1396.	3.110	3.110
T- 2.0	1-536- 85	4344.	1396.	3.110	3.110
T- 2.0	1-536- 86	4344.	1396.	3.110	3.110
T- 2.0	1-536- 87	4344.	1396.	3.110	3.110
T- 2.0	1-536- 88	15170.	1396.	10.870	10.870
T- 2.0	1-572- 101	26344.	1396.	18.870	18.870
T- 2.0	1-572- 104	17714.	1396.	12.690	12.690
T- 2.0	1-572- 105	13687.	1396.	9.800	9.800
T- 2.0	1-572- 106	82368.	1396.	59.000	59.000
T- 2.0	1-572- 107	43253.	1396.	30.980	30.980
T- 2.0	1-572- 108	70967.	1396.	50.830	50.830
T- 2.0	1-572- 112	17883.	1396.	12.810	12.810
T- 2.0	1-572- 113	18901.	1396.	13.540	13.540
T- 2.0	1-572- 114	11088.	1396.	7.940	7.940
T- 2.0	1-572- 118	47919.	1396.	34.320	34.320
T- 2.0	1-572- 119	19518.	1396.	13.980	13.980
T- 2.0	1-572- 127	10270.	1396.	7.360	7.360
T- 2.0	1-572- 133	6054.	1396.	4.340	4.340
T- 2.0	1-572- 134	21740.	1396.	15.570	15.570
T- 2.0	1-572- 135	23901.	1396.	17.120	17.120
T- 2.0	1-572- 145	3372.	1396.	2.420	2.420
T- 2.0	1-572- 158	14979.	1396.	10.730	10.730

ECO #	BUILDING #	DISCOUNTED SAVINGS	INVESTMENT COST	SIR	ESIR
T- 2.0	1-572- 162	5641.	1396.	4.040	4.040
T- 2.0	1-572- 165	11474.	1396.	8.220	8.220
T- 2.0	1-572- 170	10577.	1396.	7.580	7.580
T- 2.0	1-572- 171	12596.	1396.	9.020	9.020
T- 2.0	1-572- 175	26975.	1396.	19.320	19.320
T- 2.0	1-572- 176	42537.	1396.	30.470	30.470
T- 2.0	1-572- 177	54338.	1396.	38.920	38.920
T- 2.0	1-572- 178	46363.	1396.	33.210	33.210
T- 2.0	1-863- 91	79607.	1396.	57.020	57.020
T- 2.0	1-863- 95	3304.	1396.	2.370	2.370
W- 6.0	1- 7- 422	632.	137.	4.610	4.610
W- 6.0	1- 7- 445	341.	137.	2.490	2.490
W- 6.0	1-280- 208	655.	137.	4.780	4.780
W- 6.0	1-280- 209	175.	137.	1.280	1.280
W- 6.0	1-280- 210	1458.	274.	5.320	5.320
W- 6.0	1-536- 3	829.	274.	3.030	3.030
W- 6.0	1-536- 4	894.	137.	6.530	6.530
W- 6.0	1-536- 9	914.	137.	6.670	6.670
W- 6.0	1-536- 10	240.	137.	1.750	1.750
W- 6.0	1-536- 25	362.	137.	2.640	2.640
W- 6.0	1-536- 31	147.	137.	1.070	1.070
W- 6.0	1-536- 33	853.	137.	6.220	6.220
W- 6.0	1-536- 34	158.	137.	1.160	1.160
W- 6.0	1-536- 35	204.	137.	1.490	1.490
W- 6.0	1-536- 42	204.	137.	1.490	1.490
W- 6.0	1-536- 46	520.	137.	3.800	3.800
W- 6.0	1-536- 47	317.	137.	2.310	2.310
W- 6.0	1-572- 102	204.	137.	1.490	1.490
W- 6.0	1-572- 103	317.	137.	2.310	2.310
W- 6.0	1-572- 106	373.	137.	2.720	2.720
W- 6.0	1-572- 108	362.	137.	2.640	2.640
W- 6.0	1-572- 111	859.	274.	3.140	3.140
W- 6.0	1-572- 116	1608.	274.	5.870	5.870
W- 6.0	1-572- 118	849.	137.	6.200	6.200
W- 6.0	1-572- 121	1484.	274.	5.420	5.420
W- 6.0	1-572- 132	508.	137.	3.710	3.710
W- 6.0	1-572- 159	175.	137.	1.280	1.280
W- 6.0	1-572- 165	317.	137.	2.310	2.310
W- 6.0	1-572- 166	240.	137.	1.750	1.750
W- 6.0	1-572- 171	184.	137.	1.350	1.350
W- 6.0	1-863- 60	1459.	274.	5.320	5.320
TOTAL		5833580.	703373.	8.294	8.294

DEFINITION OF ECO CODES:

H-19.0 RADIANT SPOT HEATERS

L-12.0 REPLACE INCAND. LIGHTS W/ FLOUR.

S- 7.0 KITCHEN HOOD HEAT RECOVERY

T- 2.0 HEATING SYSTEM TIME CLOCKS

W- 6.0 TIME CLOCKS FOR DOM. WATER PUMPS

PROJECT LISTING PACKAGE # 5: TEMPERATURE CONTROLS

ECO #	BUILDING #	DISCOUNTED SAVINGS	INVESTMENT COST	SIR	ESIR
T-10.0	1- 7- 422	43609.	3021.	14.440	14.440
T-10.0	1- 7- 440	14525.	891.	16.290	16.290
T-10.0	1- 7- 442	59630.	3120.	19.110	19.110
T-10.0	1- 7- 445	19026.	1288.	14.780	14.780
T-10.0	1- 7- 446	64587.	3368.	19.180	19.180
T-10.0	1-159- 527	2227.	495.	4.500	4.500
T-10.0	1-159- 590	4523.	446.	10.150	10.150
T-10.0	1-280- 201	14006.	1337.	10.470	10.470
T-10.0	1-280- 202	7003.	693.	10.100	10.100
T-10.0	1-280- 203	14006.	1337.	10.470	10.470
T-10.0	1-280- 207	161589.	9459.	17.080	17.080
T-10.0	1-280- 208	35664.	2129.	16.750	16.750
T-10.0	1-280- 209	3566.	446.	8.000	8.000
T-10.0	1-280- 210	36961.	4556.	8.110	8.110
T-10.0	1-280- 211	26715.	3318.	8.050	8.050
T-10.0	1-280- 212	31125.	3863.	8.060	8.060
T-10.0	1-280- 213	29568.	3665.	8.070	8.070
T-10.0	1-280- 214	36010.	4507.	7.990	7.990
T-10.0	1-280- 215	46221.	5745.	8.050	8.050
T-10.0	1-280- 217	7398.	941.	7.860	7.860
T-10.0	1-280- 221	28142.	693.	40.590	40.590
T-10.0	1-280- 222	24381.	1288.	18.940	18.940
T-10.0	1-280- 223	2918.	396.	7.370	7.370
T-10.0	1-280- 224	8839.	941.	9.390	9.390
T-10.0	1-280-2111	8819.	1139.	7.740	7.740
T-10.0	1-280-2121	8819.	1139.	7.740	7.740
T-10.0	1-280-2131	8819.	1139.	7.740	7.740
T-10.0	1-280-2141	13027.	1684.	7.740	7.740
T-10.0	1-536- 1	87149.	2872.	30.340	30.340
T-10.0	1-536- 2	114059.	3764.	30.300	30.300
T-10.0	1-536- 3	76969.	2575.	29.890	29.890
T-10.0	1-536- 4	86565.	2872.	30.140	30.140
T-10.0	1-536- 8	4863.	842.	5.780	5.780
T-10.0	1-536- 9	37674.	2328.	16.190	16.190

ECO #	BUILDING #	DISCOUNTED SAVINGS	INVESTMENT COST	SIR	ESIR
T-10.0	1-536- 12	128584.	4209.	30.550	30.550
T-10.0	1-536- 16	22075.	1238.	17.830	17.830
T-10.0	1-536- 17	4409.	693.	6.360	6.360
T-10.0	1-536- 18	3957.	495.	7.990	7.990
T-10.0	1-536- 20	6290.	1486.	4.230	4.230
T-10.0	1-536- 21	27838.	1684.	16.530	16.530
T-10.0	1-536- 22	41370.	2030.	20.370	20.370
T-10.0	1-536- 23	25874.	1585.	16.330	16.330
T-10.0	1-536- 28	54601.	2625.	20.800	20.800
T-10.0	1-536- 30	4522.	891.	5.070	5.070
T-10.0	1-536- 31	1752.	446.	3.930	3.930
T-10.0	1-536- 32	1017.	248.	4.110	4.110
T-10.0	1-536- 33	9673.	3665.	2.640	2.640
T-10.0	1-536- 35	3391.	891.	3.800	3.800
T-10.0	1-536- 36	791.	248.	3.200	3.200
T-10.0	1-536- 37	12718.	1486.	8.560	8.560
T-10.0	1-536- 38	18935.	1238.	15.290	15.290
T-10.0	1-536- 39	10287.	1585.	6.490	6.490
T-10.0	1-536- 40	7009.	1387.	5.050	5.050
T-10.0	1-536- 41	20687.	1040.	19.890	19.890
T-10.0	1-536- 42	6218.	1238.	5.020	5.020
T-10.0	1-536- 43	9100.	495.	18.380	18.380
T-10.0	1-536- 44	735.	198.	3.710	3.710
T-10.0	1-536- 45	8309.	446.	18.640	18.640
T-10.0	1-536- 46	38662.	2674.	14.460	14.460
T-10.0	1-536- 47	12209.	2129.	5.730	5.730
T-10.0	1-536- 48	5370.	297.	18.070	18.070
T-10.0	1-536- 49	10683.	545.	19.610	19.610
T-10.0	1-536- 52	58162.	4011.	14.500	14.500
T-10.0	1-536- 55	6161.	2229.	2.760	2.760
T-10.0	1-536- 68	519.	198.	2.620	2.620
T-10.0	1-536- 69	519.	198.	2.620	2.620
T-10.0	1-536- 70	519.	198.	2.620	2.620
T-10.0	1-536- 71	519.	198.	2.620	2.620
T-10.0	1-536- 72	519.	198.	2.620	2.620
T-10.0	1-536- 73	648.	198.	3.270	3.270
T-10.0	1-536- 74	519.	198.	2.620	2.620
T-10.0	1-536- 75	519.	198.	2.620	2.620
T-10.0	1-536- 76	519.	198.	2.620	2.620
T-10.0	1-536- 78	519.	198.	2.620	2.620
T-10.0	1-536- 80	519.	198.	2.620	2.620
T-10.0	1-536- 83	519.	198.	2.620	2.620
T-10.0	1-536- 84	519.	198.	2.620	2.620
T-10.0	1-536- 85	519.	198.	2.620	2.620
T-10.0	1-536- 86	519.	198.	2.620	2.620
T-10.0	1-536- 87	519.	198.	2.620	2.620
T-10.0	1-536-2027	6750.	1288.	5.240	5.240

ECO #	BUILDING #	DISCOUNTED SAVINGS	INVESTMENT COST	SIR	ESIR
T-10.0	1-572- 101	15044.	2476.	6.080	6.080
T-10.0	1-572- 102	7952.	842.	9.450	9.450
T-10.0	1-572- 103	18335.	1981.	9.260	9.260
T-10.0	1-572- 104	5339.	792.	6.740	6.740
T-10.0	1-572- 105	4152.	644.	6.450	6.450
T-10.0	1-572- 106	17770.	2427.	7.320	7.320
T-10.0	1-572- 107	9309.	1288.	7.230	7.230
T-10.0	1-572- 108	15270.	2129.	7.170	7.170
T-10.0	1-572- 110	17035.	3268.	5.210	5.210
T-10.0	1-572- 111	54554.	5547.	9.840	9.840
T-10.0	1-572- 112	11018.	1585.	6.950	6.950
T-10.0	1-572- 113	5735.	842.	6.810	6.810
T-10.0	1-572- 114	4474.	347.	12.910	12.910
T-10.0	1-572- 115	21269.	2625.	8.100	8.100
T-10.0	1-572- 116	116004.	5646.	20.550	20.550
T-10.0	1-572- 118	19583.	2971.	6.590	6.590
T-10.0	1-572- 119	5966.	446.	13.380	13.380
T-10.0	1-572- 120	26780.	3268.	8.190	8.190
T-10.0	1-572- 121	97200.	4754.	20.450	20.450
T-10.0	1-572- 122	15822.	1486.	10.650	10.650
T-10.0	1-572- 123	35728.	3268.	10.930	10.930
T-10.0	1-572- 124	12670.	3219.	3.940	3.940
T-10.0	1-572- 126	12670.	3268.	3.880	3.880
T-10.0	1-572- 127	2217.	347.	6.400	6.400
T-10.0	1-572- 128	12670.	3268.	3.880	3.880
T-10.0	1-572- 130	7613.	1486.	5.120	5.120
T-10.0	1-572- 131	12670.	3268.	3.880	3.880
T-10.0	1-572- 132	8559.	2427.	3.530	3.530
T-10.0	1-572- 133	2227.	594.	3.750	3.750
T-10.0	1-572- 134	16118.	2328.	6.920	6.920
T-10.0	1-572- 135	5057.	1832.	2.760	2.760
T-10.0	1-572- 136	3404.	941.	3.620	3.620
T-10.0	1-572- 140	8041.	495.	16.240	16.240
T-10.0	1-572- 141	8948.	545.	16.430	16.430
T-10.0	1-572- 142	6030.	396.	15.220	15.220
T-10.0	1-572- 143	14460.	396.	36.500	36.500
T-10.0	1-572- 144	4522.	545.	8.300	8.300
T-10.0	1-572- 145	2464.	248.	9.950	9.950
T-10.0	1-572- 146	90132.	2971.	30.330	30.330
T-10.0	1-572- 147	14006.	792.	17.680	17.680
T-10.0	1-572- 148	6670.	2971.	2.240	2.240
T-10.0	1-572- 149	52566.	3516.	14.950	14.950
T-10.0	1-572- 150	52566.	3516.	14.950	14.950
T-10.0	1-572- 151	10344.	4606.	2.250	2.250
T-10.0	1-572- 152	7926.	3516.	2.250	2.250
T-10.0	1-572- 153	452.	248.	1.830	1.830
T-10.0	1-572- 154	7926.	3516.	2.250	2.250

ECO #	BUILDING #	DISCOUNTED SAVINGS	INVESTMENT COST	SIR	ESIR
T-10.0	1-572- 155	7926.	3516.	2.250	2.250
T-10.0	1-572- 156	9792.	4308.	2.270	2.270
T-10.0	1-572- 157	15951.	3516.	4.540	4.540
T-10.0	1-572- 158	18804.	1585.	11.870	11.870
T-10.0	1-572- 159	16600.	446.	37.240	37.240
T-10.0	1-572- 162	2399.	149.	16.150	16.150
T-10.0	1-572- 163	2939.	792.	3.710	3.710
T-10.0	1-572- 165	12605.	2030.	6.210	6.210
T-10.0	1-572- 166	3955.	545.	7.260	7.260
T-10.0	1-572- 167	14655.	743.	19.730	19.730
T-10.0	1-572- 168	3131.	297.	10.540	10.540
T-10.0	1-572- 170	2018.	297.	6.790	6.790
T-10.0	1-572- 171	2366.	347.	6.830	6.830
T-10.0	1-572- 175	15368.	1089.	14.110	14.110
T-10.0	1-572- 180	14914.	2575.	5.790	5.790
T-10.0	1-572- 181	16284.	941.	17.310	17.310
T-10.0	1-572- 182	16284.	941.	17.310	17.310
T-10.0	1-572- 183	12456.	941.	13.240	13.240
T-10.0	1-572- 184	30897.	2278.	13.560	13.560
T-10.0	1-572- 186	37230.	3665.	10.160	10.160
T-10.0	1-862- 555	25434.	1486.	17.120	17.120
T-10.0	1-863- 57	1602.	149.	10.780	10.780
T-10.0	1-863- 60	19026.	4705.	4.040	4.040
T-10.0	1-863- 61	29790.	3863.	7.710	7.710
T-10.0	1-863- 62	20678.	2724.	7.590	7.590
T-10.0	1-863- 63	48155.	7280.	6.610	6.610
T-10.0	1-863- 64	9162.	1238.	7.400	7.400
T-10.0	1-863- 65	28338.	3714.	7.630	7.630
T-10.0	1-863- 66	2654.	396.	6.700	6.700
T-10.0	1-863- 67	21329.	2823.	7.560	7.560
T-10.0	1-863- 91	32444.	2476.	13.100	13.100
T-10.0	1-863- 95	1051.	149.	7.080	7.080
T-11.0	1- 7- 440	13098.	1986.	6.590	6.590
T-11.0	1-536- 8	21204.	1986.	10.680	10.680
T-11.0	1-536- 10	21463.	1986.	10.810	10.810
T-11.0	1-536- 13	33848.	1986.	17.040	17.040
T-11.0	1-536- 17	20179.	1986.	10.160	10.160
T-11.0	1-536- 20	23927.	3972.	6.020	6.020
T-11.0	1-536- 33	36882.	5959.	6.190	6.190
T-11.0	1-536- 34	11135.	1986.	5.610	5.610
T-11.0	1-536- 35	8139.	1986.	4.100	4.100
T-11.0	1-536- 38	39283.	1986.	19.780	19.780
T-11.0	1-536- 39	48497.	3972.	12.210	12.210
T-11.0	1-536- 47	14244.	3972.	3.590	3.590
T-11.0	1-536- 68	2140.	1986.	1.080	1.080
T-11.0	1-536- 69	2140.	1986.	1.080	1.080
T-11.0	1-536- 70	2140.	1986.	1.080	1.080

ECO #	BUILDING #		DISCOUNTED SAVINGS	INVESTMENT COST	SIR	ESIR
T-11.0	1-536-	71	2140.	1986.	1.080	1.080
T-11.0	1-536-	72	2140.	1986.	1.080	1.080
T-11.0	1-536-	73	2464.	1986.	1.240	1.240
T-11.0	1-536-	74	2140.	1986.	1.080	1.080
T-11.0	1-536-	75	2140.	1986.	1.080	1.080
T-11.0	1-536-	76	2140.	1986.	1.080	1.080
T-11.0	1-536-	78	2140.	1986.	1.080	1.080
T-11.0	1-536-	80	2140.	1986.	1.080	1.080
T-11.0	1-536-	83	2140.	1986.	1.080	1.080
T-11.0	1-536-	84	2140.	1986.	1.080	1.080
T-11.0	1-536-	85	2140.	1986.	1.080	1.080
T-11.0	1-536-	86	2140.	1986.	1.080	1.080
T-11.0	1-536-	87	2140.	1986.	1.080	1.080
T-11.0	1-536-	88	11552.	1986.	5.820	5.820
T-11.0	1-572-	101	11244.	3972.	2.830	2.830
T-11.0	1-572-	104	7205.	1986.	3.630	3.630
T-11.0	1-572-	105	5565.	1986.	2.800	2.800
T-11.0	1-572-	106	16005.	3972.	4.030	4.030
T-11.0	1-572-	107	8405.	3972.	2.120	2.120
T-11.0	1-572-	108	13800.	3972.	3.470	3.470
T-11.0	1-572-	112	14818.	3972.	3.730	3.730
T-11.0	1-572-	113	7783.	1986.	3.920	3.920
T-11.0	1-572-	114	6030.	1986.	3.040	3.040
T-11.0	1-572-	115	12320.	3972.	3.100	3.100
T-11.0	1-572-	118	20685.	3972.	5.210	5.210
T-11.0	1-572-	119	5382.	1986.	2.710	2.710
T-11.0	1-572-	120	15497.	3972.	3.900	3.900
T-11.0	1-572-	124	7261.	3972.	1.830	1.830
T-11.0	1-572-	126	7374.	3972.	1.860	1.860
T-11.0	1-572-	127	2048.	1986.	1.030	1.030
T-11.0	1-572-	128	7374.	3972.	1.860	1.860
T-11.0	1-572-	131	7374.	3972.	1.860	1.860
T-11.0	1-572-	133	2366.	1986.	1.190	1.190
T-11.0	1-572-	134	21740.	3972.	5.470	5.470
T-11.0	1-572-	135	21796.	3972.	5.490	5.490
T-11.0	1-572-	145	2205.	1986.	1.110	1.110
T-11.0	1-572-	158	21917.	3972.	5.520	5.520
T-11.0	1-572-	165	9383.	3972.	2.360	2.360
T-11.0	1-572-	170	9325.	1986.	4.690	4.690
T-11.0	1-572-	171	10995.	1986.	5.540	5.540
T-11.0	1-572-	175	20685.	1986.	10.410	10.410
T-11.0	1-572-	176	52653.	1986.	26.510	26.510
T-11.0	1-572-	177	67177.	1986.	33.820	33.820
T-11.0	1-572-	178	41889.	1986.	21.090	21.090
T-11.0	1-572-	183	4732.	1986.	2.380	2.380
T-11.0	1-572-	184	11760.	3972.	2.960	2.960
T-12.0	1-536-	10	7262.	1359.	5.340	5.340

ECO #	BUILDING #		DISCOUNTED SAVINGS	INVESTMENT COST	SIR	ESIR
T-12.0	1-536-	13	10505.	1359.	7.730	7.730
T-12.0	1-536-	24	8309.	2718.	3.060	3.060
T-12.0	1-536-	25	42505.	2718.	15.640	15.640
T-12.0	1-536-	26	8309.	2718.	3.060	3.060
T-12.0	1-536-	27	8309.	2718.	3.060	3.060
T-12.0	1-536-	29	10570.	2718.	3.890	3.890
T-12.0	1-536-	34	3731.	1359.	2.740	2.740
T-12.0	1-536-	54	5539.	2718.	2.040	2.040
T-12.0	1-536-	88	3619.	1359.	2.660	2.660
T-12.0	1-572-	176	16405.	1359.	12.070	12.070
T-12.0	1-572-	177	20879.	1359.	15.360	15.360
T-12.0	1-572-	178	13033.	1359.	9.590	9.590
TOTAL			4120861.	478736.	8.608	8.608

DEFINITION OF ECO CODES:

T-10.0 THERMOSTATIC RAD. CONTROL VALVES

T-11.0 NIGHT SETBACK CONTROLS

T-12.0 OUTSIDE AIR RESET CONTROLS

PROJECT LISTING FOR PACKAGE # 6: F/H TEMPERATURE CONTROLS

ECO #	BUILDING #		DISCOUNTED SAVINGS	INVESTMENT COST	SIR	ESIR
H- 9.0	1-187-	748	587716.	158452.	3.710	3.710
H- 9.5	1-187-	748	217974.	8895.	24.500	24.500
T-10.0	1-187-	701	2659.	198.	13.420	13.420
T-10.0	1-187-	702	2659.	198.	13.420	13.420
T-10.0	1-187-	703	2659.	198.	13.420	13.420
T-10.0	1-187-	704	2659.	198.	13.420	13.420
T-10.0	1-187-	705	2659.	198.	13.420	13.420
T-10.0	1-187-	706	2659.	198.	13.420	13.420
T-10.0	1-187-	707	2659.	198.	13.420	13.420
T-10.0	1-187-	708	2659.	198.	13.420	13.420
T-10.0	1-187-	709	2659.	198.	13.420	13.420
T-10.0	1-187-	710	7781.	347.	22.450	22.450
T-10.0	1-187-	711	7781.	347.	22.450	22.450
T-10.0	1-187-	712	7781.	347.	22.450	22.450
T-10.0	1-187-	713	7781.	347.	22.450	22.450
T-10.0	1-187-	714	7781.	347.	22.450	22.450
T-10.0	1-187-	715	7781.	347.	22.450	22.450

ECO #	BUILDING #	DISCOUNTED SAVINGS	INVESTMENT COST	SIR	ESIR
T-10.0	1-187- 716	7781.	347.	22.450	22.450
T-10.0	1-187- 717	7781.	347.	22.450	22.450
T-10.0	1-187- 718	7781.	347.	22.450	22.450
T-10.0	1-187- 719	7781.	347.	22.450	22.450
T-10.0	1-187- 720	7781.	347.	22.450	22.450
T-10.0	1-187- 721	7781.	347.	22.450	22.450
T-10.0	1-187- 722	7781.	347.	22.450	22.450
T-10.0	1-187- 723	7781.	347.	22.450	22.450
T-10.0	1-187- 724	7781.	347.	22.450	22.450
T-10.0	1-187- 725	7781.	347.	22.450	22.450
T-10.0	1-187- 726	7781.	347.	22.450	22.450
T-10.0	1-187- 727	7781.	347.	22.450	22.450
T-10.0	1-187- 728	7781.	347.	22.450	22.450
T-10.0	1-187- 729	7781.	347.	22.450	22.450
T-10.0	1-187- 730	7781.	347.	22.450	22.450
T-10.0	1-187- 731	7781.	347.	22.450	22.450
T-10.0	1-187- 732	7781.	347.	22.450	22.450
T-10.0	1-187- 733	7781.	347.	22.450	22.450
T-10.0	1-187- 734	7781.	347.	22.450	22.450
T-10.0	1-187- 735	7781.	347.	22.450	22.450
T-10.0	1-187- 736	7781.	347.	22.450	22.450
T-10.0	1-187- 737	7781.	347.	22.450	22.450
T-10.0	1-187- 738	7781.	347.	22.450	22.450
T-10.0	1-187- 739	7781.	347.	22.450	22.450
T-10.0	1-187- 740	7781.	347.	22.450	22.450
T-10.0	1-187- 741	7781.	347.	22.450	22.450
T-10.0	1-187- 742	7781.	347.	22.450	22.450
T-10.0	1-187- 743	7781.	347.	22.450	22.450
T-10.0	1-187- 744	7781.	347.	22.450	22.450
T-10.0	1-187- 745	7781.	347.	22.450	22.450
T-10.0	1-187- 746	7781.	347.	22.450	22.450
T-10.0	1-187- 747	14006.	2080.	6.730	6.730
T-10.0	1-187- 748	14006.	2080.	6.730	6.730
T-10.0	1-862- 578	11165.	1436.	7.770	7.770
T-12.0	1-159- 505	15044.	2718.	5.530	5.530
T-12.0	1-159- 506	15044.	2718.	5.530	5.530
T-12.0	1-159- 507	13812.	2718.	5.080	5.080
T-12.0	1-159- 508	13812.	2718.	5.080	5.080
T-12.0	1-159- 509	13812.	2718.	5.080	5.080
T-12.0	1-159- 510	15044.	2718.	5.530	5.530
T-12.0	1-159- 511	21917.	2718.	8.060	8.060
T-12.0	1-159- 512	9255.	2718.	3.400	3.400
T-12.0	1-159- 513	15044.	2718.	5.530	5.530
T-12.0	1-159- 514	13812.	2718.	5.080	5.080
T-12.0	1-159- 516	13812.	2718.	5.080	5.080
T-12.0	1-159- 517	13812.	2718.	5.080	5.080
T-12.0	1-159- 518	15044.	2718.	5.530	5.530

ECO #	BUILDING #	DISCOUNTED SAVINGS	INVESTMENT COST	SIR	ESIR
T-12.0	1-159- 519	15044.	2718.	5.530	5.530
T-12.0	1-159- 520	15044.	2718.	5.530	5.530
T-12.0	1-159- 521	15044.	2718.	5.530	5.530
T-12.0	1-159- 523	15044.	2718.	5.530	5.530
T-12.0	1-159- 524	13812.	2718.	5.080	5.080
T-12.0	1-159- 525	13812.	2718.	5.080	5.080
T-12.0	1-159- 526	21917.	2718.	8.060	8.060
T-12.0	1-159- 529	14539.	2718.	5.350	5.350
T-12.0	1-159- 530	15044.	2718.	5.530	5.530
T-12.0	1-159- 531	13500.	2718.	4.970	4.970
T-12.0	1-159- 532	16016.	2718.	5.890	5.890
T-12.0	1-159- 533	10634.	2718.	3.910	3.910
T-12.0	1-862- 534	16322.	2718.	6.000	6.000
T-12.0	1-862- 536	16322.	2718.	6.000	6.000
T-12.0	1-862- 537	16322.	2718.	6.000	6.000
T-12.0	1-862- 538	16322.	2718.	6.000	6.000
T-12.0	1-862- 539	16322.	2718.	6.000	6.000
T-12.0	1-862- 540	16322.	2718.	6.000	6.000
T-12.0	1-862- 541	16322.	2718.	6.000	6.000
T-12.0	1-862- 542	16322.	2718.	6.000	6.000
T-12.0	1-862- 543	16322.	2718.	6.000	6.000
T-12.0	1-862- 544	16322.	2718.	6.000	6.000
T-12.0	1-862- 545	16322.	2718.	6.000	6.000
T-12.0	1-862- 546	16322.	2718.	6.000	6.000
T-12.0	1-862- 547	16322.	2718.	6.000	6.000
T-12.0	1-862- 548	16322.	2718.	6.000	6.000
T-12.0	1-862- 549	16322.	2718.	6.000	6.000
T-12.0	1-862- 550	16322.	2718.	6.000	6.000
T-12.0	1-862- 551	16322.	2718.	6.000	6.000
T-12.0	1-862- 552	16322.	2718.	6.000	6.000
T-12.0	1-862- 553	16322.	2718.	6.000	6.000
T-12.0	1-862- 554	16322.	2718.	6.000	6.000
T-12.0	1-862- 556	16322.	2718.	6.000	6.000
T-12.0	1-862- 557	16322.	2718.	6.000	6.000
T-12.0	1-862- 558	16322.	2718.	6.000	6.000
T-12.0	1-862- 559	16322.	2718.	6.000	6.000
T-12.0	1-862- 560	16322.	2718.	6.000	6.000
T-12.0	1-862- 561	16322.	2718.	6.000	6.000
T-12.0	1-862- 562	16322.	2718.	6.000	6.000
T-12.0	1-862- 563	16322.	2718.	6.000	6.000
T-12.0	1-862- 564	16322.	2718.	6.000	6.000
T-12.0	1-862- 565	16322.	2718.	6.000	6.000
T-12.0	1-862- 566	16322.	2718.	6.000	6.000
T-12.0	1-862- 567	16322.	2718.	6.000	6.000
T-12.0	1-862- 568	16322.	2718.	6.000	6.000
T-12.0	1-862- 569	16322.	2718.	6.000	6.000
T-12.0	1-862- 570	16322.	2718.	6.000	6.000

ECO #	BUILDING #	DISCOUNTED SAVINGS	INVESTMENT COST	SIR	ESIR
T-12.0	1-862- 571	16322.	2718.	6.000	6.000
T-12.0	1-862- 572	16322.	2718.	6.000	6.000
T-12.0	1-862- 573	16322.	2718.	6.000	6.000
T-12.0	1-862- 574	16322.	2718.	6.000	6.000
T-12.0	1-862- 575	16322.	2718.	6.000	6.000
T-12.0	1-862- 576	16322.	2718.	6.000	6.000
T-12.0	1-862- 577	16322.	2718.	6.000	6.000
T-12.0	1-862- 579	13418.	2718.	4.940	4.940
T-12.0	1-864- 603	16322.	2718.	6.000	6.000
T-12.0	1-864- 604	16322.	2718.	6.000	6.000
T-12.0	1-864- 605	16322.	2718.	6.000	6.000
T-12.0	1-864- 606	16322.	2718.	6.000	6.000
T-12.0	1-864- 607	16322.	2718.	6.000	6.000
T-12.0	1-864- 608	16322.	2718.	6.000	6.000
T-12.0	1-864- 609	16322.	2718.	6.000	6.000
T-12.0	1-864- 610	16322.	2718.	6.000	6.000
T-12.0	1-864- 611	16322.	2718.	6.000	6.000
T-12.0	1-864- 612	16322.	2718.	6.000	6.000
T-12.0	1-864- 613	16322.	2718.	6.000	6.000
T-12.0	1-864- 614	16322.	2718.	6.000	6.000
T-12.0	1-864- 615	16322.	2718.	6.000	6.000
T-12.0	1-864- 616	16322.	2718.	6.000	6.000
T-12.0	1-864- 617	16322.	2718.	6.000	6.000
T-12.0	1-864- 618	16322.	2718.	6.000	6.000
T-12.0	1-864- 619	16322.	2718.	6.000	6.000
T-12.0	1-864- 620	16322.	2718.	6.000	6.000
TOTAL		2518147.	421312.	5.978	5.978

DEFINITION OF ECO CODES:

H- 9.0 PIPE INSULATION

H- 9.5 INSULATE VALVES & FITTINGS

T-10.0 THERMOSTATIC RAD. CONTROL VALVES

T-12.0 OUTSIDE AIR RESET CONTROLS

PROJECT LISTING PACKAGE # 7: SCHOOL BUILDING MODS.

ECO #	BUILDING #	DISCOUNTED SAVINGS	INVESTMENT COST	SIR	ESIR
B-18.0	1-159- 528	24934.	2229.	11.190	11.190
B-18.0	1-159- 591	16622.	1486.	11.190	11.190
L-12.0	1-159- 591	103967.	18214.	5.710	5.710

ECO #	BUILDING #	DISCOUNTED SAVINGS	INVESTMENT COST	SIR	ESIR
T-10.0	1-159- 528	70144.	7626.	9.200	9.200
T-10.0	1-159- 591	57077.	6240.	9.150	9.150
T-10.0	1-536- 56	5539.	2030.	2.730	2.730
T-10.0	1-536-2003	2366.	347.	6.830	6.830
T-10.0	1-536-2004	1670.	248.	6.740	6.740
T-10.0	1-862- 581	19476.	2179.	8.940	8.940
W- 2.0	1-536-2004	2529.	369.	6.860	6.860
W- 6.0	1-159- 528	1895.	411.	4.610	4.610
W- 6.0	1-159- 591	1509.	411.	3.670	3.670
W- 6.0	1-862- 581	441.	137.	3.220	3.220
TOTAL		308169.	41927.	7.350	7.350

DEFINITION OF ECO CODES:

B-18.0 SEAL LOADING DOCK DOORS  
L-12.0 REPLACE INCAND. LIGHTS W/ FLOUR.  
T-10.0 THERMOSTATIC RAD. CONTROL VALVES  
W- 2.0 INSULATE DOMESTIC HOT WATER LINES  
W- 6.0 TIME CLOCKS FOR DOM. WATER PUMPS

V. CONCLUSIONS:

It is recommended that the package previously outlined be outlined be implemented. Each task included in this package will improve the buildings' energy consumption efficiencies in a cost effective manner, which is in compliance with the Army's "Energy Conservation Investment Program." Implementation of this package will allow Augsburg Military Community to meet their energy conservation goals. It is projected that implementation of this project will reduce energy use by 28.1% when compared to the 1983 reported energy consumption.

The following table outlines the savings and costs attributable to this package:

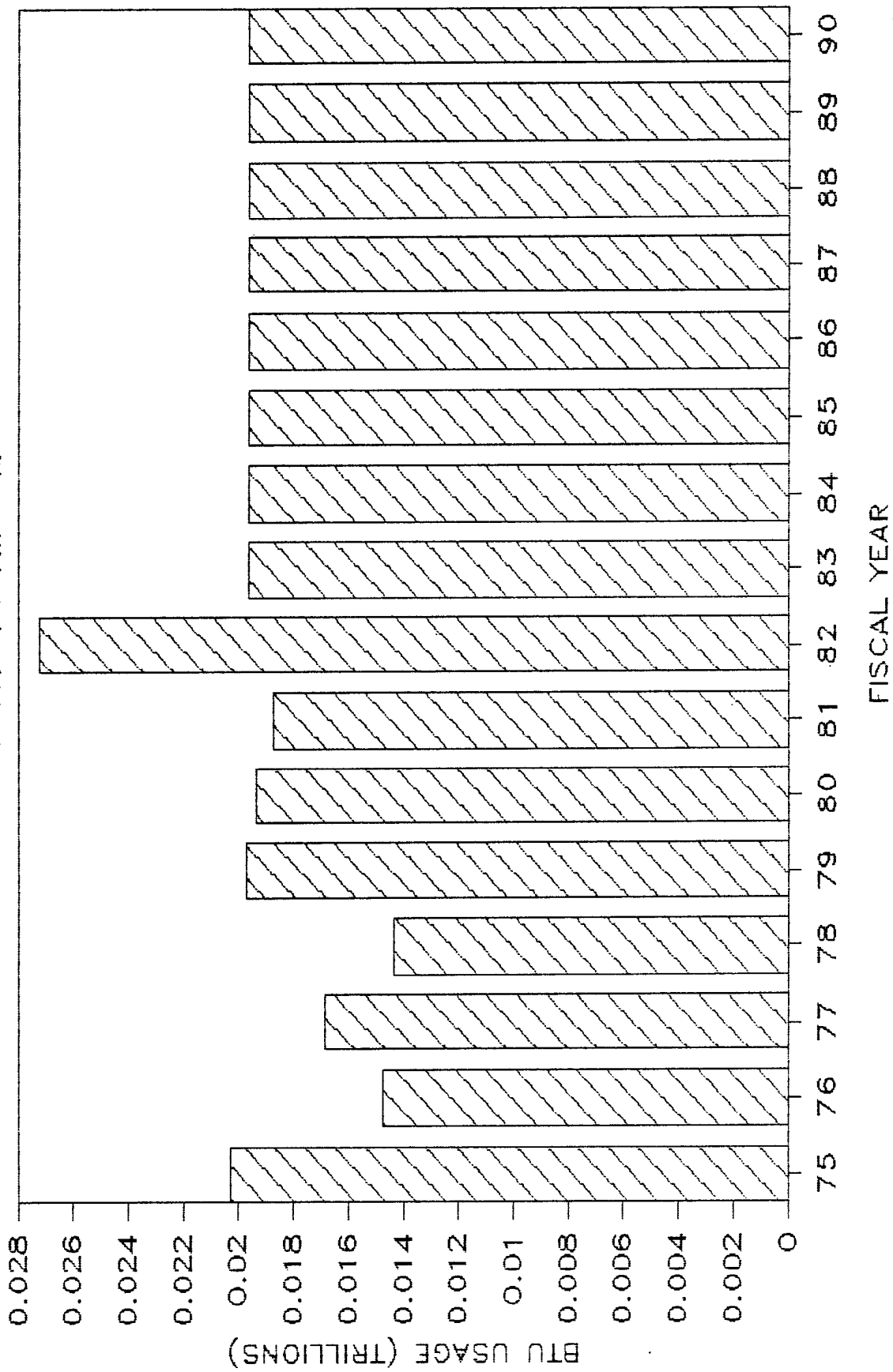
SUMMARY TABLE

	Annual Savings \$	Discounted Savings \$	Total Cost \$	SIR
Package #1	73,183	1,095,549	805,772	1.360
Package #2	980,072	10,912,287	885,398	12.320
Package #3	364,970	5,751,867	1,301,891	4.418
Package #4	452,685	5,833,580	703,373	8.294
Package #5	368,045	4,120,861	478,736	8.608
Package #6	214,632	2,518,147	421,312	5.978
Package #7	27,871	308,169	41,927	7.350

The following graphs predict the energy consumption and cost if all seven packages are funded. For the first six graphs, showing projected energy consumption for Augsburg, it can be seen that actual fuel consumption was used for fiscal years 1975 through 1983. However, for years 1983-1988 straight line projections are shown utilizing 1983 data. The 1983 data was used because this is the last year for which detailed utility data was collected in our Phase I Data Report. The energy savings were distributed evenly for fiscal years 1989 and 1990, as would be anticipated if construction begins in 1989. Actual fuel costs are used for years 1983-1985. However, fuel cost projections for years 1986-1990 were difficult to affix. For example, the fuel costs of electricity went down from 1983 to 1984 and then again for 1984 to 1985. It is our opinion that this trend could not continue. Therefore, we used the 1985 costs to project the energy costs through 1990. The same situation occurred with coal prices. However, for years 1986-1990, the 1985 coal price/ton was used while inflating the shipping costs 5%/year. The #2 oil costs went down from 1983 to 1984 and increased from 1984 to 1985. Therefore, the costs used for years 1986-1990 equals the 1985 oil cost.

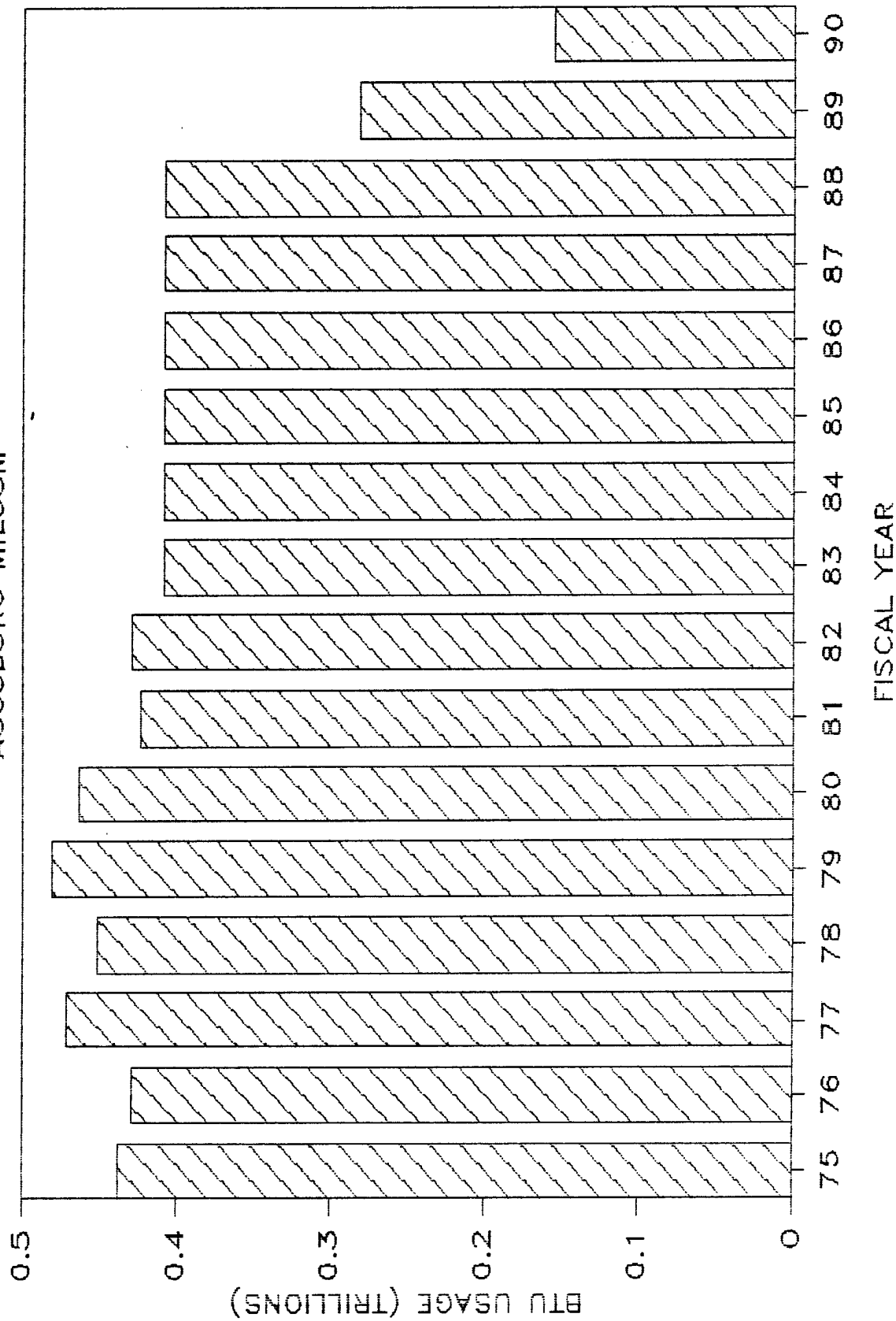
# PROJECTED NATURAL GAS USE

AUGSBURG MILCOM



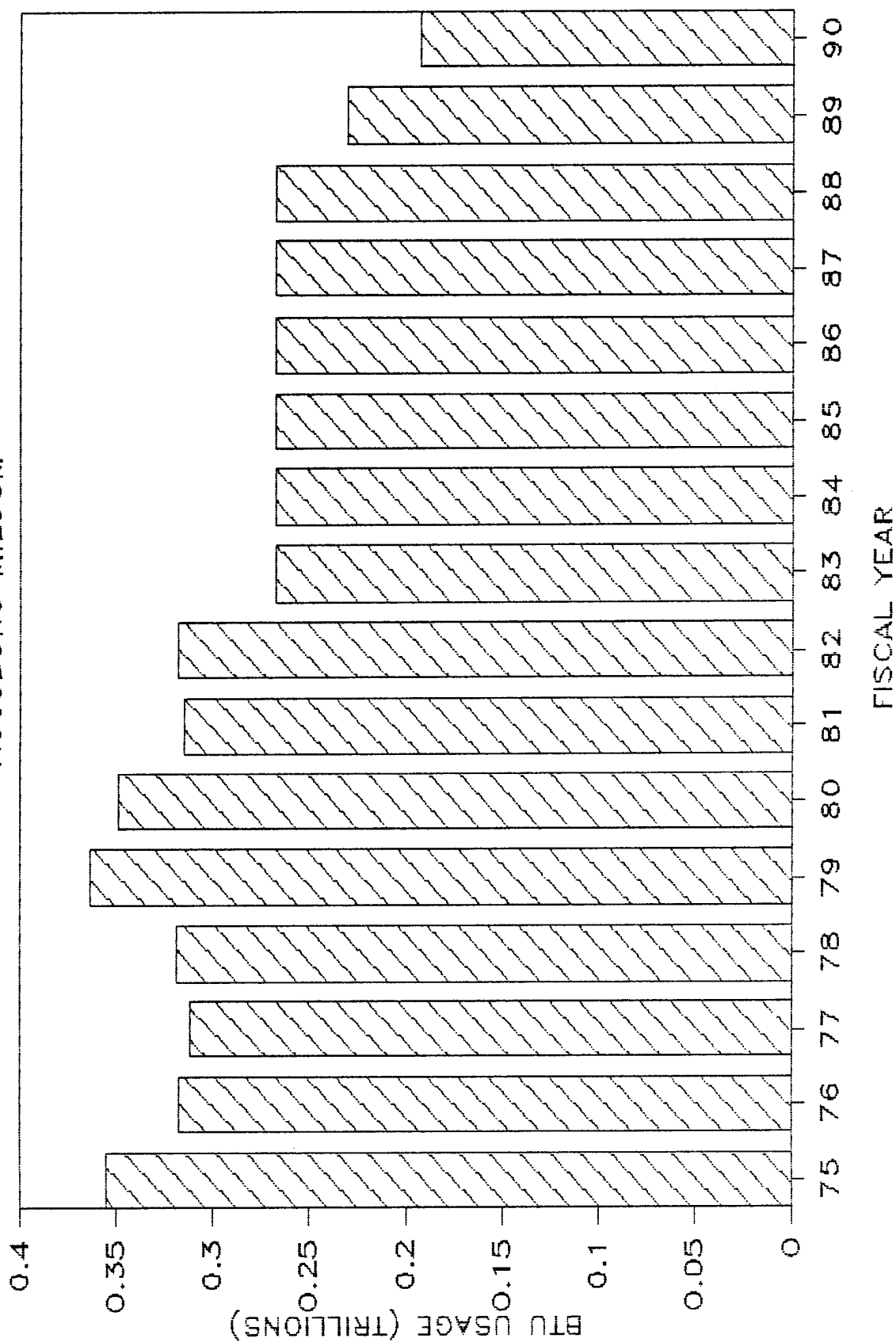
# PROJECTED ANTHRACITE COAL USE

## AUGSBURG MILCOM



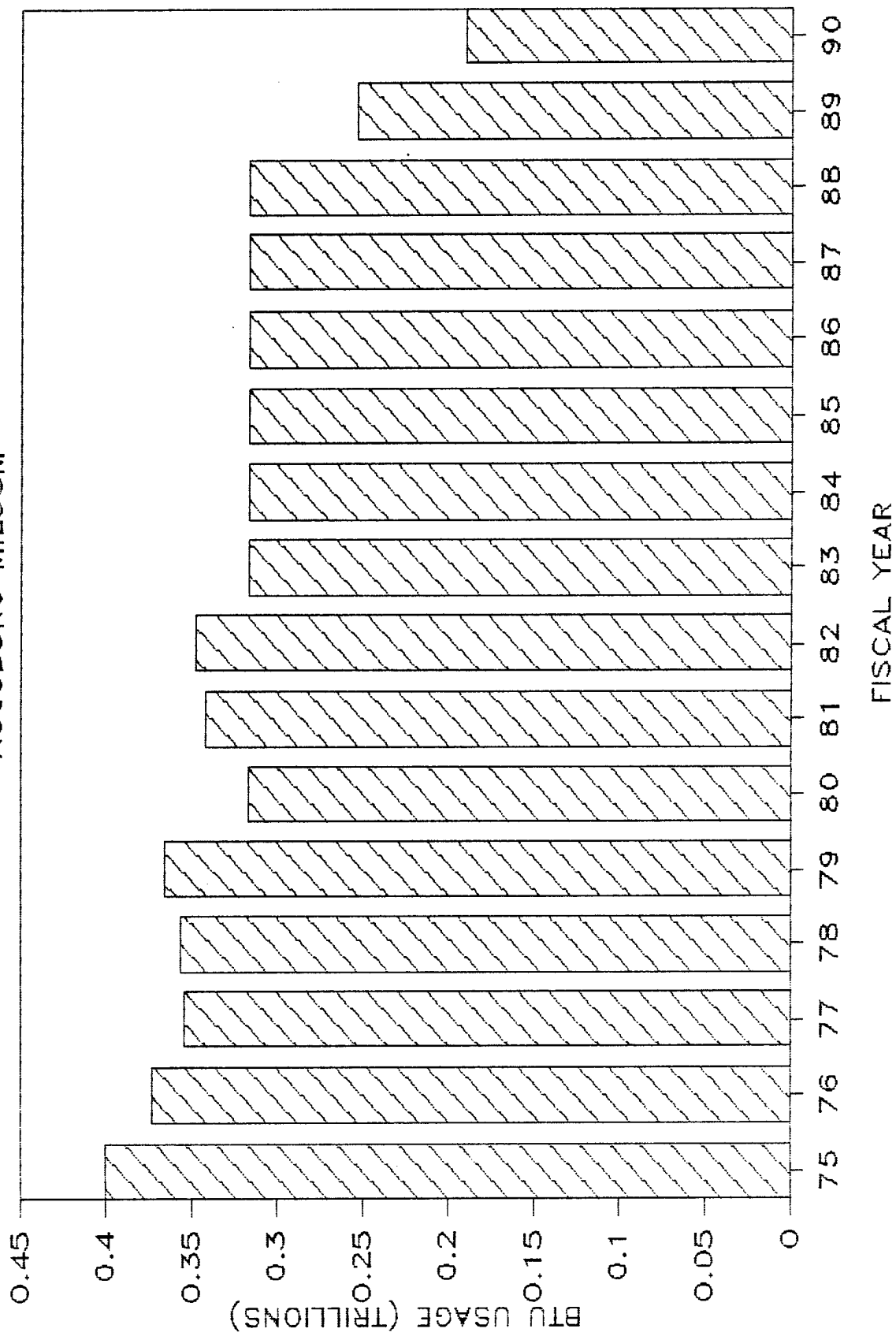
# PROJECTED BITUMINOUS COAL USE

## AUGSBURG MILCOM



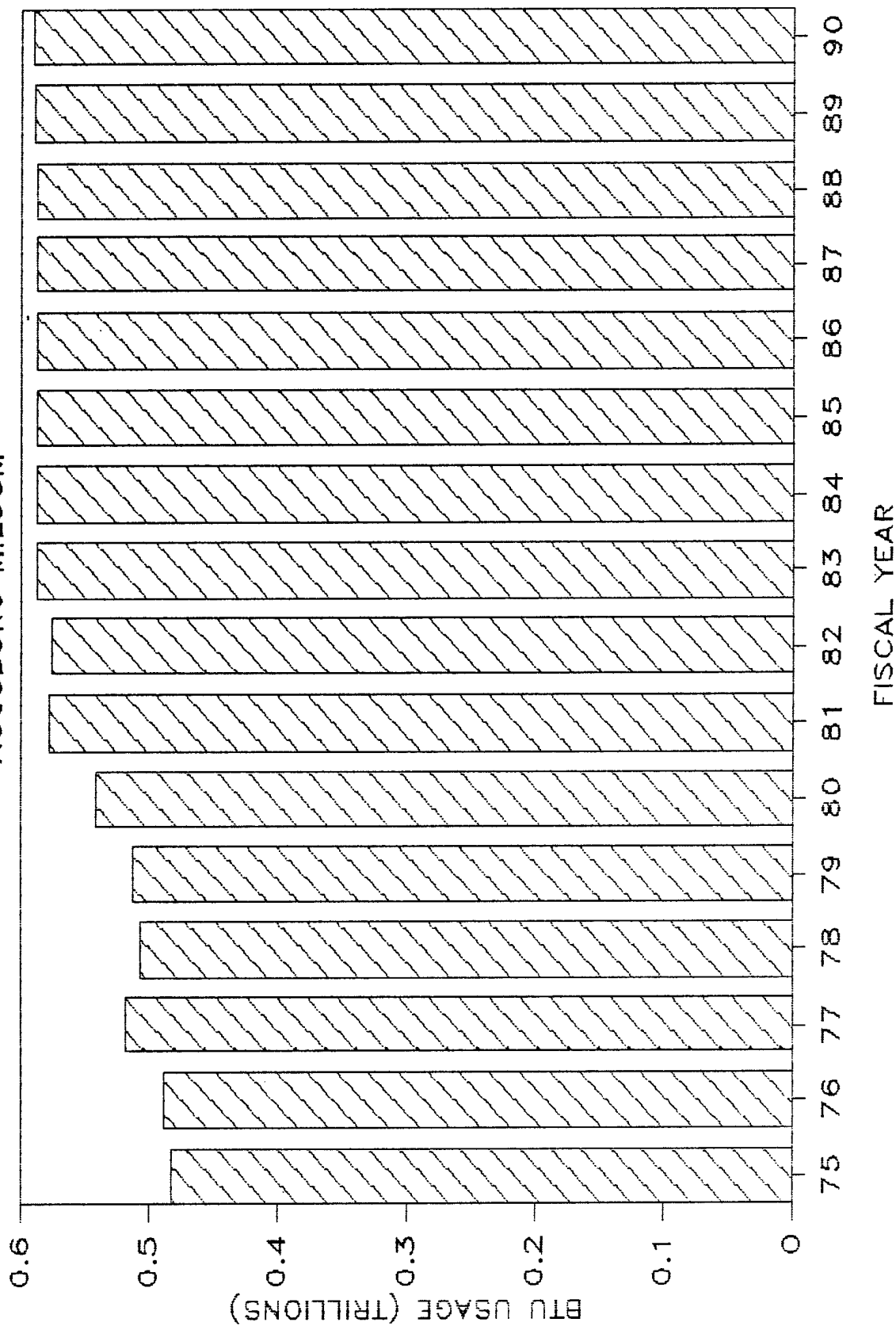
# PROJECTED FUEL OIL USE

AUGSBURG MILCOM



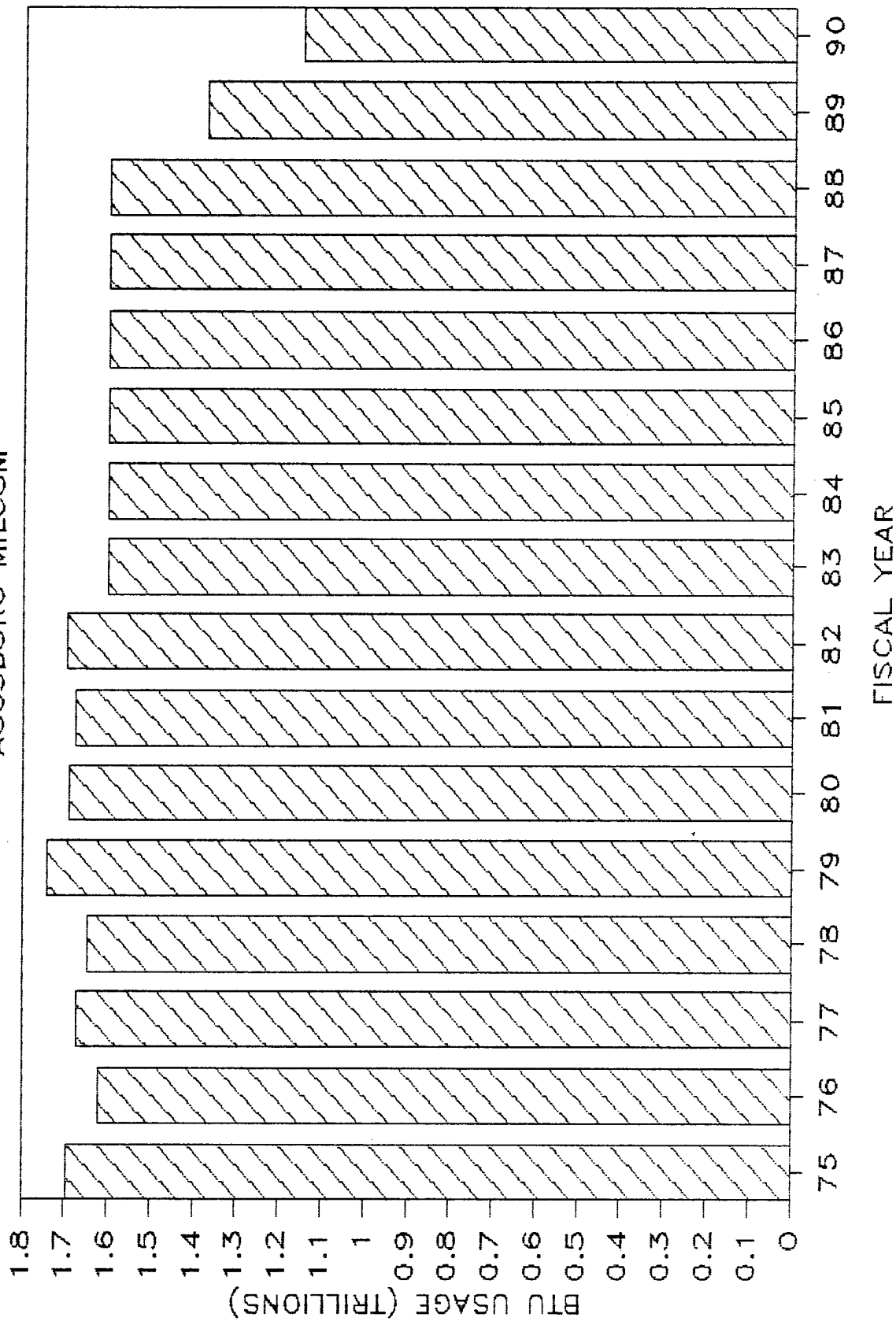
# PROJECTED ELECTRIC USE

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# PROJECTED TOTAL ENERGY USE

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# PROJECTED TOTAL ENERGY COST

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